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THE AMERICAN
JOURNAL OF PHARMACY

JUNE, 1918

EDITORIAL.

THE CONSERVATION OF ALCOHOL, SUGAR AND GLYCERIN IN MEDICINES.

Dr. Franklin Martin, member of the advisory commission and chairman of the general medical board of the Council of National Defense, issues the following statement:

During the past several weeks there has been considerable discussion throughout medical and pharmaceutical circles relative to the conservation of alcohol, glycerin, and sugar as applied to medicinal products.

Governmental and other authorities interested, realizing that careful consideration should be given the subject, recently met and debated the advisability and necessity of conservation measures from the standpoint of medical needs. In view of the importance of alcohol, sugar, and glycerin in the manufacture of pharmaceutical preparations and of the limited possibilities for the conservation of alcohol and sugar therein, it was deemed advisable to refrain at this time from recommending conservation of sugar and alcohol in so far as their use in pharmaceutical preparations is concerned.

The amount of glycerin used in medicine when compared to the available supply was found to be relatively large, and a committee was appointed to investigate formulæ, manufacturing processes, etc., requiring glycerine and to submit plans for the curtailment of the quantity now used in case future developments should make it necessary to adopt conservation measures in relation to medicines.

Economy in the use of such expensive solvents as alcohol and glycerin must at all times claim the attention of pharmacists. Under the war conditions now confronting us, conservation becomes a patriotic duty as well as a national obligation. Medicines, however, and especially the standard legal formulas of the Pharmacopœia and the National Formulary, should be the very last products calling for changes and only under the most exacting conditions should legal standards be diminished.

Unfortunately much of the discussion engaged in has been purely academic and not based upon "that careful consideration" which such important subjects should command. Before any official promulgation be made of changes in legal standards or of regulations affecting the needs of the drug trade for medical supplies, a thorough survey of the *actual conditions and needs* should be made by practical men and not by theorists. The necessity of conserving the industries of the country and manitaining these at their maximum efficiency has at times appeared to be overlooked by over-enthusiastic officials or notoriety seekers.

At the hearing referred to, it was stated that more alcohol was available at the present time than would be required by the United States and our allies for some time to come and further that immense stores of corn unsuited for food consumption as such would rot unless used as a source for alcohol production. Other sources for the production of alcohol available to the American people indicate no lack of supplies or possibility of need for conservation.

Regarding sugar, it developed that the consumption of sugar for medicines was but a very small percentage (possibly not more than one fifth of one per cent.) of the total consumption. Since in the recent regulations promulgated for the conservation of sugar supplies, the production of ice cream, surely a pure luxury, was to be encouraged and allotted a full one hundred per cent. of sugar requirements, consistency will require that the same privilege be extended to druggists and manufacturers needing sugar for medicines which must be classed with the necessities.

The statement then made that upwards of twenty per cent. of the glycerin produced in the country was consumed in medicines, we are inclined to doubt. It may be true that such a percentage of the total amount produced passes through the drug and chemical trades, but it is within our knowledge that, in recent years especially, much of this has been resold and diverted to industries not at all associated with medicinal products. We are inclined to believe that an actual survey made would prove the unreliability of the statistics upon which this statement was made.

G. M. B.

THE ANNUAL PHARMACEUTICAL MEETINGS.

The season for the annual conventions of many of the state associations of pharmacists is at hand and the time for the meeting of the American Pharmaceutical Association is rapidly approaching. The programme as announced for the meeting of this national association at Congress Hotel, Chicago, August 12 to 17, is a well-balanced arrangement replete with a menu of scientific, professional, educational and trade interest problems and interspersed with sufficient entertainment features to relieve the monotony of a too heavy diet.

Despite the fact that the American Pharmaceutical Association was organized in 1852 and that many of the State Pharmaceutical Associations date back more than twenty-five years, it is disappointing to note that so large a proportion of the men engaged in pharmacy and drug trade pursuits, who are eligible for membership, are not yet associated with either local, state or national associations of pharmacists.

These various associations have important duties to perform in order to advance the professional status of pharmacy and to protect those practicing pharmacy and the various trade interests connected with the collection, manufacture and distribution of drugs and chemicals. In the discharge of these duties an association serves all and cannot discriminate between those who are members and non-members. Conversely it would appear as a universal duty for pharmacists and druggists to give loyal support as members of these organizations.

Throughout many years of membership in pharmaceutical associations the writer has never met a member who has not expressed himself as well repaid for attendance at a meeting. No matter what may be the line of work of the individual he will find sufficient of interest to him at the meeting to at least obtain his quid pro quo. This is an age of coöperative effort and the opportunities for personal profit are in direct proportion to the amount of coöperation given. The following abstract from a publication of a contemporary movement is applicable alike to the professional side of pharmacy as to the trade interests.

Every business man who is alert to the trend of the times must realize that the day of the old-fashioned, selfish, non-coöperative merchant is rapidly

passing and that the dawn of the day for collective and coöperative competition is breaking over the business of the world.

This does not mean in any way the curtailment of individuality; quite on the contrary, it means a greater reward than ever before for the individual effort, for the stronger the character and individuality, the greater the multiplication of that power through the collective effort of the future, the wider the scope of usefulness and service to the community, and consequently the larger the personal success.

The business man who does not accept and join in this great development must eventually realize that he belongs to another age, that he is out of the running, and that his life's work may be lost.

May these timely expressions sink into the minds and influence the future actions of those who have been indifferent to their share in the responsibilities of pharmaceutical organizations.

G. M. B.

LOYALTY AND EFFICIENCY THE DEMAND OF THE HOUR.

Presumably this is a practical age. Certainly, as never before in the history of the world, is there necessity for efficiency. Nevertheless, the thoughtful citizen has not failed to note the numerous impractical ideas that have appeared from time to time in the daily press and not infrequently been advocated in professional and trade journals. Unfortunately some of these have been tried by governmental authority and he realizes that under the present state of public mind there is going to be a period of contest between theory and practice. The misapplication of zeal and energy in impractical undertakings is simply the loss of a portion of the nation's assets and the more numerous and the more pronounced these national blunders the more serious may be the results.

We have heard much of "Germany's efficiency" and we are compelled to admit that the advantage that nation has so far attained in the war is due to the application of scientific principles and the practical application of her men and resources rather than to any superiority of mentality or resources.

The idealist usually has a basis for his theories and his recommendations are as a rule the outgrowth of experience or the study of available data and so he may perform a national service by advancing progressive ideas. Not so, however, the dreamer whose

fancied pictures may be without any foundation and the following of whose fancies may lead to disaster.

Pharmacy has not been devoid of its idealists with Utopian schemes nor of its dreamers whose pictures lead to the dangers of false conservation or imaginary security, men who, while lacking in the experience of practical operations of the mercantile pursuits, are very self-contained in their opinions and advice to those upon whom has devolved the duty of meeting the nation's demands in this respect. The artist skillfully paints on the same piece of canvas the mountain and the valley and the production appeals to our artistic taste of the beautiful but does not deceive us as to contour. The dreamer on the contrary presents a camouflage that may be but the covering of a calamitous pitfall.

President Wilson has very forcefully called the attention of the people of the United States to our wastefulness as a nation. The truthfulness of his statement and the necessity for national reform in this matter demands the serious consideration of all loyal citizens. The wastefulness as a nation is not only the inordinate use of materials and the national profligacy of resources but can likewise be applied to the misapplication of efforts and the wrong apportionment of service. The disorganization of industries and the use of trained specialists, such as pharmacists, in lines of work foreign to their educational fitness for service is a national loss and waste of national assets and the continuation of such errors must have a distinct effect upon our national success. The mobilization of every calling and industry into the most efficient service for the government would undoubtedly result in such a proper use of our vast national resources that the preponderance thereof would very speedily terminate the war.

No amount of loyalty and obedience to the orders of departments will overcome the evils of misapplication and the consequent loss of efficiency. The study of the best means of obtaining efficiency from our inhabitants and our national resources is a prime duty of those in authority. The practical man of business and of experience must sooner or later be given an opportunity to demonstrate the value of his knowledge and experience and the sooner the theorists and dreamers are relegated to a rear couch the better. The demand of the hour is for loyalty and efficiency harnessed in one team.

G. M. B.

MEDICINAL PLANTS—PRESENT AND FUTURE SUPPLIES.[1]

By Prof. Henry Kraemer, University of Michigan.

We have heard so much about our country's unpreparedness and the apparent inability of the government to adequately cope with the war situation, that it must be indeed a relief to learn that in the domain of medical and surgical supplies there has been a spirit of coördination between the government forces and the manufacturers of the United States, which has resulted in the highest possible efficiency and could hardly have been improved upon had it been foreshadowed that the World War situation would arise.

At the outbreak of the European war in August, 1914, and for a short time thereafter, owing to the erratic trade conditions which prevailed, the drug market was in a turmoil. There was a disposition on the part of some to overstock, while others refused to purchase at the increasing prices which were prevalent. Very soon, however, there was a reaction and a marked stabilization was effected by the large drug dealers and manufacturers who advised caution, but not to the point of restricting trade. At the time of the formal declaration of war with Germany, the news was received in the drug market with a marked absence of excitement of any kind. In other words while there was a suspicion that there ultimately would be a break with our country and the German Empire, our markets retained their conservative position to an unparalleled extent. There was no attempt made to increase prices beyond the point actually called for by the unsettled conditions. Furthermore, I have been unable to discover a single instance in which there was any disposition to speculate in the drug market, even though for a time there was a steady increase in prices, which in some instances attained from ten to twenty times the quotations current prior to the war.

In a remarkably short time the chaotic conditions were mastered. Other foreign sources of drug supplies were opened. New industries were developed and incorporated, so that as the war has progressed the high prices prevalent two years ago have decreased on the average about 35 per cent. Probably no one industry has

[1] Presented to the American Philosophical Society, Friday A. M., April 19.

been subjected to more uncertainty and suffered greater inconvenience than the drug trade. Due to national and international conditions, there has been a shortage and restriction in crude drugs of all kinds. Transportation on land has been restricted and upon the sea it was uncertain, and every time a steamer was sunk on the ocean dealers knew that some drugs were on the vessel and that there would be a corresponding shortage. In spite of all the vicissitudes a call was sent throughout the country to the drug trade to comply with the government's demands and as a result the medical and surgical supplies were given precedence in every instance.

This remarkable condition of affairs was brought about by the temperament of the average American business man to improve his opportunities. When it was seen that there was an opportunity for the expansion of business and the possibility of world trade he with his usual perspicacity seized upon it most effectively. He increased his capital and assisted in the perfecting of existing organizations, so that at the outbreak of the war in April, 1917, all interests were coördinated and all the drug forces were mobilized. As to how effective this work of organization had been is shown by the fact that our exports had increased from about $46,000,000 in 1915 to nearly $200,000,000 during the fiscal year of 1917. It should also be stated that while this initiative was being taken and notwithstanding our resources were taxed to the utmost that the manufacturers adjusted their buying and selling so that there was a fair distribution of crude materials and an opportunity afforded every industry to expand to its utmost. A finer example of the benefits of democracy has never been demonstrated in the history of the United States. While this mobilization of industrial forces was looked upon as a matter of good business, just as soon as war was declared it was apparent that it was to be utilized for the benefit of the nation. Upon the United States entering the war the Manufacturers of Medicinal and Surgical Supplies immediately offered their services for the nation's defense. Conferences were held between the Committee on Preparedness of the American Drug Manufacturers' Association and the Committee on Medical and Surgical Supplies of the Council for National Defense. The initial meetings were held on Saturday afternoon and evening and Easter Sunday morning in 1917, and plans were worked out which have since been successfully in operation. It might seem that the question of medical supplies was of minor importance, and yet no single orders for

medical supplies have ever been given that have exceeded the government's requirements. The range of drugs was quite extensive and the quantities demanded were somewhat as follows:

100,000 ounces of quinine,
20,000 ounces of strychnine,
138,000,000 compound cathartic pills.

One of the big side issues involved the adequate supply of containers, something like 6,000,000 being required. There was no disposition for any one firm to attempt to monopolize the orders and the question of distribution was left to competitive bids, and those best fitted obtained the government orders.

The American Drug Manufacturers' Association organized a War Service Committee, rendering prompt assistance to the various departments of the government when they were called upon. Indeed, had this organization not been well organized for prompt service, the government more than once would have suffered from unexpected delays incident to the securing of certain drugs which were widely distributed in small quantities among retailers throughout the country. This is only in line with the spirit which has been generally manifested of heartily coöperating with the government and a genuine desire to meet any of the demands, restrictive or otherwise, deemed essential by the authorities. In other words, the drug trade manifested a desire from the start to continue its service to the public and at the same time to coöperate with the policy announced or to be announced by the President or Congress. There was no indication of any intention on the part of any one to benefit from the scarcity of certain drugs and it was fully appreciated that certain basic conditions of world merchandising should be followed.

If Germany anticipated that in the question of medicines the United States would be at all handicapped or inconvenienced, she must to-day realize her error in judgment. At only one point did Germany have any advantage and that was in the manufacture of organic chemicals which American manufacturers did not engage in for several reasons. In the first place the quantities sold were relatively small, secondly there was a great number of them and finally there seemed to be no opportunities for any "big game" or "haul." In other words, it was a big investment in a lot of little things. During the past few months, however, American manufacturers

have separated the essential from the non-essential, and, acting under the provisions of the Trading with the Enemy Act, a number of American firms have procured licenses to manufacture a number of organic drugs, using enemy-controlled patents. In this list are three of the most important synthetics used by the medical profession, viz., barbital, procaine and arsphenamine, which have respectively replaced veronal, novocaine, and salvarsan.

In the second place German manufacturers were successful in securing special privileges which were beneficial to the foreign manufacturer and inimical to the development of American industries. This was in part due to the decisions of the patent office and also to the inedaquate tariff protection. We have placed a protective tariff upon our steel industry and consequently made it the wonder of the world and have established it so thoroughly that we no longer fear competition from any country. We have blindly failed to see the wonderful possibilities in the similar protection and development of the chemical industries. Without enlarging on this question there is every indication that the United States Congress has fully grasped the situation and will see to it that American industries are encouraged, and that in the future American industries will be coördinated with the life of the nation.

Coming to the subject of the Present and Future Supplies of Medicinal Plants which I have been requested to consider, the conditions in this country during the past three years have been similar to those outlined in a general way, and the outlook is exceedingly promising. The most serious drawback is the one involving the employment of labor. Then there is the uncertainty involving the specific substances required and the quantities which may be needed. This is exemplified to some extent in the gathering of digitalis leaves in the western United States. Certain of our western universities have been acting as collecting points for the gathering of wild-grown digitalis. This work has been done on the one hand in behalf of the National Council of Defense, and on the other for the use of the Red Cross. From information which has just come to my hand there is sufficient digitalis growing wild in the western part of Washington state to supply several times over the entire demand for this drug in the United States. In addition digitalis is very abundant in the western part of Oregon and British Columbia. Before the war this was allowed to go to waste and practically all that was used in the United States was imported from Europe. Since

last fall there was received at the University of Washington approximately 1,200 pounds of dried digitalis leaves collected by patriotic organizations in western Washington and donated for use in army medical supplies. A large quantity has also been collected at the University of Oregon. In addition to these supplies collections have been made during the past two or three years independently in the State of Washington, and I understand that during the season of 1917, because of the scarcity of labor and high prices paid for the same, it was very difficult to secure enough digitalis to fill the orders which had been received from various manufacturers of pharmaceutical products in the United States. It is practically impossible at the present time to depend upon local collectors, so that one is under the necessity of hiring laborers and sending them into the districts in which digitalis is known to grow in abundance.

We are developing our natural resources as never before. There are fortunately very few drugs which have gone into what is called the "scarce class." These include jalap and scammony, both of which enter into the composition of compound cathartic pills. Jalap is obtained from plants growing in the Mexican Andes and for some years back the supplies have been hardly adequate. I recently examined the tubers of a closely related plant coming from Mexico which gives a far larger yield of the drastic resin, and at the present time it seems very likely that we can obtain supplies for all immediate needs. Scammony root comes to us from the Levant and there is none upon the market at the present time. Here again we are rather fortunate in being able to procure from Mexico the root of a closely related species which contains a resin having practically the same therapeutic properties as in the Levant scammony and of this Mexican scammony we have almost unlimited supplies.

A most interesting situation has developed in regard to styrax, the official article coming from the Levant and being at the present time unobtainable. A year or two ago the market price of the imported styrax was between six and seven dollars per pound. A similar product can be obtained from the sweet gum tree, *Liquidambar Styraciflua,* a tree which is common throughout the entire central and eastern United States. In fact at the present time an American styrax can be gathered and sold at a profit at $1.50 per pound. This American balsam closely resembles the Levant article, and for some purposes seems to be superior. Liquid petrolatum, commonly known as "mineral oil," formerly came from Russia,

not because it was not produced in the United States in great quantities, but was imported more cheaply. To-day we are practically independent of foreign sources and are using especially the heavy California liquid petrolatum.

In addition to making the most of our natural resources, a new industry has been developed in that we are beginning to cultivate certain medicinal plants on a rather large scale. The most interesting part of this work is that it is calculated to revolutionize our knowledge of medicines. It has brought us to a realization that we have not been independent in thought and manufacture, but have been influenced to a very great extent upon European traditions and prejudices. Up until six or seven years ago no one in this country cultivated digitalis, and our pharmacopœial standards were based largely upon foreign pharmacopœias which required that leaves should be of wild plants and of second year's growth, and that they should be most carefully preserved in an atmosphere over burnt lime. American investigators showed first that cultivated plants were equally as valuable as wild plants, furthermore that the constituents of first-year leaves were the same as second-year leaves, and finally that all that was necessary was for them to be dried in the ordinary manner and kept dry.

To-day we are growing in various parts of the country a great variety of medicinal plants. Several of our large manufacturers have farms for their own use. There are a few rather large independent growers of medicinal plants and finally quite a number of our large universities in the West have experimental farms for the scientific study of medicinal plants. It is quite within the probability that within the next ten years at least 50 per cent. and it may be more, nearly 90 per cent., of all the medicinal plants which are useful will either be grown in the United States or collected from indigenous plants. This new industry could hardly have received greater stimulus than by a war cataclysm such as we are now upon. Crude drug dealers and manufacturers are alert to this situation and there are quite a number of new drug companies which are now extensively advertising "American Botanical Drugs," "Wild and Cultivated," "Collected, Cultivated, Cured, etc., under our own management." One can hardly realize the importance of this trend of events unless he was conversant with the actual conditions upon the market a few years ago. At the present time there is inspection and oversight of drugs at the point of collecting.

Up until recently there was a divided opinion in this country as to the possibility of cultivating medicinal plants and placing this industry on a paying basis. There has been a prejudice in this country against seriously considering this subject in a practical manner. No doubt some of this sentiment was started in the interest of those who were exporting drugs to this country. Fortunately, however, some ten or twenty years ago there were those who recognized that our supplies of native plants were being reduced as well as of inferior quality and attention was directed to the necessity of providing for future supplies through drug farming. Of course, sporadic attempts had been made to grow medicinal plants in this country, but, with the exception of ginseng, the attempts could hardly be termed successful. Valerian was grown in Vermont, licorice in New Jersey, saffron near Lebanon, Pa., but these efforts were of hardly more than local interest. When Mrs. Gene Stratton Porter wrote her book on "The Harvester," she struck a psychological moment and to a remarkable degree influenced business men to consider seriously this question. In the meanwhile experiments had been conducted which showed that cultivated plants were nearly if not more efficient than wild plants, and with the acceptation of this theory a few manufacturers were ready to farm a certain number of medicinal plants. Then again the U. S. Department of Agriculture had established a division wholly given to the investigation of this question. This department has done very much in an experimental way and through counsel to direct this work and assist in its development. Apart, however, from all these agencies there were a few, as A. M. Todd, of Kalamazoo, and John A. Bornemann, of Norwood, Pa., who independently and upon their own initiative have forged ahead, making a success, one in the cultivation of peppermint and the other in the cultivation of belladonna and a few other plants. The war situation, however, brought us face to face with a possible scarcity of a number of valuable crude drugs and with the experience which we have been gaining we are rapidly building up this new industry.

Large quantities of the Solanaceous drugs are used in the United States and the market supplies of these have been considerably curtailed. There is no question, however, but that sufficient quantities of the plants yielding these drugs will be raised in the United States to supply all of our future needs. One of my old students will have forty acres in *Atropa Belladonna* alone, and he has orders for the

entire harvest, although not a single seedling has been put out of doors. There are others who are devoting considerable attention to this same plant. *Datura Stramonium* is likewise being grown to a very large extent. *Hyoscyamus niger* has given us considerable trouble, but the particular obstacles in growing this plant have been surmounted, so that we are likely to secure fairly good supplies of henbane.

Many of the drugs for which standards are provided by the U. S. Pharmacopœia are used in sufficiently large quantities in other industries, so that growing of the plants yielding them is attracting very wide interest. For instance licorice root, of which there are thousands of pounds imported from Russia and Spain, is to be grown on a rather large scale again in New Jersey. One thousand acres of barren land in New Jersey are to be given over to the cultivation of the licorice plant, and already some thirty acres have been planted, using the rhizomes which were imported from Mediterranean countries. This should prove to be a very good paying crop and it might be encouraged among a number of farmers, providing that some bureau of marketing be established to assemble the crops. *A priori,* one would rather expect that this would prove to be a very favorable crop in the West where *Glycyrrhiza lepidota* abounds in a wild state. Of course, some interests might be developed in the licorice fern, *Polypodium vulgare,* which is quite common in the state of Washington, and contains a principle resembling the glycyrrhizin of licorice.

The resumption of the production of camphor in the United States is of very great interest. Work has been resumed at the 2,000-acre camphor grove near Satsuma, Fla., which is operated by New York capital. For some years experiments have been conducted by the Bureau of Plant Industry of the U. S. Department of Agriculture, including the propaganda and culture of camphor and the laboratory and factory phases of camphor production. In order that the production be economically conducted, it is necessary that the operations be performed on a large planting scale. Recently the Department of Agriculture has built a "trimmer" machine for cutting down the stems and it is an excellent illustration of one of the ways in which the government endeavors to coöperate in the establishment of new industries which should have a healthy existence in this country.

There are strong indications that the farming of perfume-yield-

ing plants will meet with an early success in this country. Thymol, an important medicine in the treatment of hookworm, is practically unavailable at the present time. Nevertheless the experiments of the government conducted at Orlando, Fla., and Madison, Wis., have shown that an acre planted with horsemint (*Monarda punctata*) will yield about forty pounds of oil. It has been calculated that the commercial production of this oil can be made to show a profit of about $16.00 per acre. The range of odoriferous plants and those yielding volatile oils which have been experimented on by the government include: Anise, basil, cajeput, calamus, camphor, caraway, cassia, chamomile, citronella, cumin, curcuma, eucalyptus, fennel, galangal, geranium, ginger, horsemint, lavender, lemongrass, marjoram, orange, palmrosa, pennyroyal, peppermint, rose, rosemary, sage, spearmint, tansy, thyme, vetiver, wormseed, wormwood and ylang ylang.

The cultivation of medicinal plants, while one of very great promise, requires a conservative handling of the situation. In this country there are a great many small growers, and quite a number of firms having small yards who are eager to experiment in this work. As a pastime it is likely to be of very great interest, but very few realize the dangers connected with it. Only recently it was reported that a whole family barely escaped death by poisoning when through an accident a can of belladonna seeds was used in the preparation of the morning coffee. If persons have fair success in growing any of these medicinal plants they quite naturally are anxious to dispose of them at a profit, and then the situation is very pathetic. Usually the farmer knows nothing as to their yield of active principles, and if a fair price is offered him he is very likely to be dissatisfied and the result is not at all calculated to maintain his interest in this work. The Department of Agriculture has determined on a conservative policy in regard to the stimulation of the drug production. They are disseminating the necessary information to those who are specially trained and supplying the needed information to them. When we reflect that there was hardly any interest in the growing of drug plants twenty years ago, yet taking it as a whole there has been considerable progress made, and it is not too much to predict that this industry will grow apace with that of other industries that have been started in the United States and while we may not be entirely independent yet we will never be as dependent upon other nations as we have been up until the present time. Not

only will many of the important foreign medicinal plants be cultivated in the United States, but many of our wild indigenous drug-yielding plants will be studied and their production brought under definite control. When this time comes, it is quite likely that the price of medicines made from crude drugs will be considerably reduced and at the same time a higher and more uniform quality be secured. Adulteration and substitution will be entirely eliminated, as nearly all of the instances of sophistication in drugs is due to either carelessness or ignorance in collecting them.

Probably I should call attention to the castor-oil industry, which is being developed on a very extensive scale in Florida and Texas. The amount of castor oil consumed during normal times in this country is enormous, averaging the product expressed from over one million bushels of castor beans per year. Most of our commercial supplies have come from India, Manchuria and South America. The chief interest of the government to-day in castor oil is not its medicinal use, but its value as a lubricant for aëroplanes using a rotary motor. The demand for lubricants of this class is very great, and apparently there is no oil which is as valuable as a lubricant for fine machinery. The farmers of the Southern states are being interested and it is likely that a hundred thousand acres will be planted in castor beans. The Signal Corps of the United States government are arranging contracts with the farmers, and Dr. W. W. Stockberger, of the U. S. Department of Agriculture, is advising the farmers on such questions as the planting, growing, care and harvesting of the crop as seems best to fit each individual case. The experiments thus far conducted in the United States show that the yield per acre of castor oil seeds is between 900 and 1,350 pounds. Individuals plants alone will yield something like twenty pounds of seeds. The seeds will yield from 50 to 70 per cent. of fixed oil. This means that the yield per acre would be between 500 and 900 pounds of castor oil, or a return of nearly $300 per acre. When one considers that the care of cultivation is not more than with corn and that the plants are unusually free from fungus diseases, the success of the government crop is practically assured.

The situation then in a nutshell regarding the present and future supplies of medicinal plants in the United States is very encouraging. It has been universally acceded that in point of elegance the medicinal preparations made by American manufacturers are unexcelled. Indeed, there are quite a few American houses with

branches in various parts of the civilized world. They have been supplying for some years more than one half of the medicines prescribed by physicians in the United States, and it is quite likely that one tenth of the medicinal preparations used throughout the civilized world are derived from American sources. At only one point have we been lagging behind, and this has been in the manufacture of synthetic chemical drugs, as also the productions of raw materials, such as are yielded by the cultivation of plants. The low price of foreign labor has been the chief cause operating against our developing the farming of medicinal and economic plants, as we could purchase our supplies from other countries at comparatively low figures. Now that the government has in some instances taken a vital interest in this subject, it is quite likely that some form of legislation will be passed in which there will be a subsidizing of certain industries in a manner similar to that followed by foreign governments.

Furthermore, our manufacturers have seen the importance of extending their research laboratories, and it is quite likely that scientific work will be greatly stimulated in the United States. Never before in the history of our country have we seen the close relationship between the scientifically trained expert and the manufacturer and between the inventor and the banker. The relationship is very simple and readily comprehended, as it is based on the theory of practical business. If the capitalist can be shown that any laboratory work is likely to become a commercial success, he is at once interested and his investment is certain. The story of Marshall Field and the cable is known to every schoolboy and to some it may have seemed that all the manufacturers and business men of the United States have lacked has been the supreme "nerve" which is required in the launching of new projects. This war has brought the capitalist and the industrial worker together, and no one can doubt the practical results which will be forthcoming in the future. Indeed, unless there was some such mutual understanding it would not be possible for this country to have developed almost overnight the chemical industries on such a gigantic scale. Finally, the effectiveness of our production which has been increased since this war, is due in large part to the thorough organization of our American industries, and accompanying such organization have been corresponding benefits to the nation.

SOME OLD-TIME MEDICINES.

By Dr. Fred B. Kilmer, New Brunswick, N. J.

It may be stated that some drugs and preparations are born great, at other times they attain greatness by inherent potential value, in other instances greatness is thrust upon them and such greatness may be deserved or undeserved. Finally, we have it that medicines at one time winning popularity, apparently achieving great things for mankind, in one way or another either slowly or suddenly lose their prestige, and at last wane to the vanishing point.

It cannot be rightfully stated that a drug or a preparation which in the course of time has fallen into disuse is thereby valueless; indeed it is conceded that many medical and surgical procedures which have fallen into disuse or have been neglected were in their time of great value, and probably would be to-day were their use revived. In other words, the disuse of many of the older remedies and methods has in certain instances been ill advised.

This is not to say that medicine and pharmacy have not advanced —at times they have moved forward a thousand years in a day, but in the onrush it is possible that without due consideration things have been cast overboard. If we look back into the history of pharmacy and medicine we find whole classes of medicines at one time high in esteem only to be wholly or almost wholly discarded in a later century. As an example, such lines as elixirs, theriacums, waters, essences, mithrydates, balms, balsams, varieties of ointments and herbs, some of which have long since fallen into disuse and have become almost entirely forgotten. It is possible that with the long list of remedies we have at hand to-day there is no need to resurrect them, except that it is possibly our duty as pharmacists to be alive to the situation and in case an attempt is made to introduce under a new guise something that has heretofore been discarded, to be sufficiently familiar with the history of our calling that we may not be caught napping. Again, it is possible that in some instances the old discarded remedies contain principles which might be of value were their use revived. With this as an introduction it may not be unwise to trace a few of the preparations at one time of high popularity and in time living almost only in history.

Black Draft.—Originally devised by the court physician of Rudolph II, about the year 1600, and becoming a popular laxative.

The original formula was made up of senna, currants, coriander seed, cream of tartar and made into a decoction which afterward became official in the London and Edinburgh Pharmacopœias, as an infusion of senna.

CITRINE OINTMENT.—An ointment was known in the early centuries under this title composed of coral, quartz, white marble, white lead and tragacanth mixed with lard, suet and hen's fat. Afterwards the formula was revised by omitting some of the older ingredients and substituting sugar of lead, rose water and frankincense. In 1722 nitrate of mercury ointment (citrine ointment) became official. The first use of the yellow ointment of mercury appears to have been for the eyes, afterwards its use was extended to other maladies.

FOWLER'S SOLUTION OF ARSENIC.—Seems to have had its origin in a quack remedy containing arsenic and that subsequently an English apothecary named Thomas Fowler produced a mixture of arsenic flavored and colored with spirits of lavender. Fowler himself stated that the spirits of lavender were added to give the mixture a medicinal appearance and to avoid the use of the term "arsenic" in the title of the preparation. At the height of its popularity it attained considerable reputation for fever and ague.

FRIAR'S BALSAM.—It would appear that while this only became official in the London Pharmacopœia in 1746, for generations previous there had been sold a number of compounds under the name of Friar's Balsam, Jesuit's Drops, Turlington's Drops, etc., of a similar nature. It is supposed that it is possible this originated among some of the medical friars. The official preparation is our well-known tincture of benzoin compound.

HIERA PICRA.—Preparations under this name could possibly have been bought in Damascus one thousand years ago, and possibly in Rome and Alexandria more than a thousand years beyond that time. It is sometimes stated to be the oldest Pharmacopœial compound that remains. It is still used in some of the country districts of America and Europe. A feature of the preparation is that from its beginning it has in one way or another been a preparation of aloes, flavored, sweetened and colored.

COMPOUND TINCTURE OF LAVENDER.—At one time standing on the pinnacle of glory. Originally a compound of French brandy and twenty-seven other ingredients, including lavender, rosemary, cinnamon, nutmegs, cubebs, saccharine and roses. Somewhere in

its history it acquires the title of "palsy drops." It is probable that its alcoholic and spicy nature was its only therapeutic value.

DIACHYLON PLASTER.—This plaster is said to have been invented in the year one of the Christian era by Menecrates, who was physician to the Emperor Tiberius. There was, however, in existence a plaster made of so-called mucilages and lead before this time. Menecrates made his combination of mucilages of foenugreek, linseed, marshmallow and oil with litharge. An interesting feature is that the original formula was assembled in the form of a verse. From time to time the formula was improved. Its original name is retained to this day (its literal meaning is a preparation of juices). Now, of course, it is a lead plaster. In its earliest days an adhesive plaster was known under the names of persons who made changes in the formula. While still official this plaster is now only in limited use on account of the popularity of the india-rubber adhesive compounds. It is admitted, however, that there are certain conditions in which this plaster, notwithstanding its disadvantages, is superior for many purposes to any other form of adhesive. If a plaster with similar properties could be made with an india-rubber base it is believed this would be a considerable improvement in respect to adhesive plaster.

DOVER'S POWDER.—The invention of a London doctor by the name of Thomas Dover, who lived in the seventeenth century, held the center of the stage for many generations. The original Dover's powder was a diaphoretic powder containing opium, saltpeter, licorice, ipecac. The originator of the preparation stated he gave as high as 100 grains of the mixture. It became official in the London Pharmacopœia in 1788, having been made famous as a sweating powder. It is still in use but only to a limited extent by the rank and file of practitioners.

LAUDANUM.—The original preparation under this name was quite different from the tincture of opium which bears this synonym to-day. Paracelsus, whose name stands out as one of the master pharmacists of classic times, is the reputed inventor. The original preparation contained opium, orange and lemon juice, frog sperm water, cinnamon, cloves, ambergris, saffron, to which was added pearls and the quintessence of gold. The laudanum of the early pharmacopœia was a pill mass of opium, saffron, castorium, ambergris, musk and oil of nutmeg. The great Sydenham devised the laudanum which attained great popularity on the continent. This

formula corresponds more or less with the original laudanum of the pharmacopœias. There was also a similar preparation known as "black drop," which was really a vinegar of opium. There was also a vinegar of opium in the Edinburgh and Dublin pharmacopœias. To-day the name is retained as a synonym of the official tincture of opium. In the course of time the laws regulating the sale of narcotics have curtailed the sale of our familiar laudanum. There are doubtless authorities who would agree that the original preparation of laudanum had advantages over the present official preparation sold under this name.

SEIDLITZ POWDERS.—It has been suggested that this term is a misnomer. The famous Hoffman discovered the Seidlitz spring in Bohemia in 1724. The spring owed its properties to the presence of sulphate of magnesia and the sulphate of soda. It is stated this spring was at one time the principal source of epsom salts and it is well known that epsom salts was bottled and sold under this designation. In some countries to-day the term Seidlitz salts is the name for sulphate of magnesia. The original Seidlitz powder was a patented preparation claimed to possess all the properties of the medicinal Seidlitz spring in Germany. There were three powders, tartrate of soda, bicarbonate of soda, and tartaric acid; they were sold under numerical designations. The real Seidlitz powder as we know it had its origin in the substitution of a pleasing effervescent drink for a nauseous one. Seidlitz powders have in the course of their history attained widespread popularity; at times their use has waned by the introduction of mineral waters and other more popular aperients.

OPODELDOC.—This is also an item attributed to the great Paracelsus. The original preparation was opodeldoc plasters containing galbanum, ammoniac, bdellium, litharge, opodeldoc, linseed oil, waxes, and oil of laurel, to which was added numerous powders in vogue at the time to give color and odor. The plaster was a "heal all." In the course of time the name was transferred from the plaster to a liquid soap liniment which became official early in the eighteenth century. A preparation known as Steer's Opodeldoc was a preparation containing ammoniac added to the original soap liniment. Opodeldoc had at times a widespread use. To-day it holds only a subordinate position. Undoubtedly for many purposes its use is important.

PAREGORIC.—In its origin known as paregoric elixir. The origi-

nal Swedish formula contained honey, licorice, camphor, oil of senna, and salt of tartar. The original formula has been greatly modified in passing through the pharmacopœias; to-day we still have paregoric with similar properties quite different from the ancient combination and with a rather waning use and popularity.

FOUR THIEVES VINEGAR.—Older pharmacists can probably remember the popular aromatic and antiseptic vinegars. The original preparation is said to have been devised to prevent the spread of the plague. The story goes that during a plague four thieves went about the French city of Toulouse plundering the dead and the dying, and the secret of their immunity was a vinegar used as a prophylactic. Preparations of this character in a limited way had descended to modern times. Their use in the sick room has at least had the merit of being refreshing and in a mild way antiseptic.

MITHRIDATUM.—Of all the famous compounds this stands out among the records of pharmacy and medicine. The inventor is said to be Mithridates the Great, King of Pontus, Asia Minor, who lived two centuries before Christ. The preparation has passed down through the centuries, sometimes containing a very large number of ingredients, at other times as few as a hundred, and sometimes less. Preparations of this character at times have acquired immense fame, Roman emperors have been recorded as compounding them with their own hands. The greatest physicians have studied this preparation with a view if possible of perfecting it.

THERIACUMS.—Are a modification of the original under other designations. At the present day we look upon these compounds as of the order of the shotgun mixtures, but in any event for long centuries they held sway as of the greatest value in medicine.

LANOLIN.—Incidentally we may regard wool grease as a substance long used by the ancients for anointing and healing, and again revived in our own day, where it has acquired a place of great value in the healing art.

One could thus go on and enumerate name after name of preparations famous in the history of medicine. The point to be urged is that it is not only interesting to know the name, origin and the preparation of these old-time medicines, but also to bear in mind that their value is not altogether historical, and we should ever keep before us that there is a possibility that in these there may be something that may be of value to the healing art.

CHLORINE AS A STERILIZING AGENT.

By Frank N. Moerk.

The term chlorination has come into use since the introduction of liquid chlorine as a sterilizing medium. This is not technically correct, for it creates the impression that sterilization is accomplished directly by the chlorine. This, however, is not the case, since the addition of chlorine to water results primarily in the formation of hypochlorous acid, according to the equation:

$$Cl_2 + H_2O = HClO + HCl.$$

The hypochlorous acid, which is unstable in the presence of organic matter, liberates nascent oxygen, as follows:

$$HClO = HCl + O.$$

Therefore it is evident that chlorination is in reality an indirect oxidation, which depends upon the preliminary formation of hypochlorous acid or its salts.

Chlorine when dissolved in water does not dissociate to any great extent, since it does not appreciably increase the conductivity of pure water. Yet we know that its oxidizing properties are dependent upon the presence of moisture. These facts are explained by the formation of hypochlorous acid, the concentration of which bears a definite relation to that of chlorine, according to the law of mass action, and therefore the hypochlorous acid is replenished as fast as consumed at the expense of the chlorine.

This agrees with the theory that chlorine acts by removing or combining with hydrogen, and thereby liberates oxygen, the ultimate reaction being

$$Cl_2 + H_2O = 2HCl + O.$$

This equation does not show the intermediate reactions which are illustrated by the previous equations.

Available Chlorine.—Available chlorine is the term used to denote that portion of the total chlorine content that takes part in the formation of hypochlorites, whereby oxygen is liberated. It will be noted from the first equation that one molecule, or two atoms of chlorine, forms one molecule of hypochlorous acid, and from the second equation that one molecule of hypochlorous acid is capable of liberating one atom of oxygen. It is this atomic oxygen that is

determined analytically and calculated to chlorine, and this chlorine equivalent is what is known as available chlorine. Potential oxygen would be a far more suitable term.

CHLORINATING OR OXIDIZING MEDIA.—There are two chemicals now in use for sterilization of water and sewage, namely chlorinated lime or bleaching powder, and liquid chlorine. The former has for its chief ingredients, calcium oxy-chloride,[1] $CaOCl_2$, and calcium hydroxide, $Ca(OH)_2$. When chlorinated lime is added to water the oxy-chloride becomes a true hypochlorite, according to the equation:

$$2CaOCl_2 + H_2O = Ca(OCl)_2 + CaCl_2 + H_2O.$$

Thus we have an alkaline hypochlorite solution, due to the calcium hydroxide.

Liquid chlorine, on the other hand, when added to water forms hypochlorous and hydrochloric acids in dilute solutions, as follows:

$$Cl_2 + H_2O = HClO + HCl.$$

In this case an acid hypochlorite solution results.

IONIC INFLUENCE ON HYPOCHLORITES.—Since acid and alkaline solutions contain an excess of hydrogen and hydroxyl ions respectively, it may be stated that these ions exert an influence upon the action of the hypochlorites. The natural tendency of all unstable substances is to become stable, so there is a spontaneous reaction among the hypochlorite molecules which results in the formation of chlorates and chlorides, as illustrated by the equation:

$$3HClO = HClO_3 + 2HCl.$$

The chlorates are more stable than the hypochlorites in dilute solutions, and are therefore inferior oxidizing agents, while the chlorides are inert. The reaction depicted above is accelerated by hydrogen and retarded by hydroxyl ions,[2] which means that hypochlorites are more stable in alkaline solutions. The hydrogen ion also increases the reaction velocity of the hypochlorites, or in other words the velocity of oxidation is greater in acid solutions.

PROCESSES INVOLVED DURING DIFFUSION.—In practice, the chlorinating media are applied locally and have to diffuse throughout the entire mass of the water or sewage to be sterilized, which means that the ultimate degree of sterilization is largely dependent upon the rate of diffusion.

[1] Ellms.

[2] LeBlanc.

Two distinct processes take place during the diffusion of the chlorinating media. The first is the spontaneous decomposition of the hypochlorite, which proceeds to a greater extent with chlorine than it does with chlorinated lime. The second is the oxidation of the organic matter, the velocity of which is greater with chlorine than with chlorinated lime.

COMPARISON OF CHLORINE WITH CHLORINATED LIME.—It has been shown above that the loss of potential oxygen is not so great with chlorinated lime as it is with chlorine and that the velocity of oxidation is lower with chlorinated lime. This latter fact is important because the oxidation of organic matter is not selective, although some substances are more readily oxidized than others. Chlorinated lime, owing to its lower reaction velocity, will diffuse to a far greater extent than chlorine, without having its potential oxygen depleted, and will come in contact with and destroy a larger number of bacteria. Therefore, given the same quantity of potential oxygen in both cases, it is evident that it will have a higher bacterial efficiency in the form of chlorinated lime.

EFFECT OF TEMPERATURE.—The influence of temperature upon the velocity of reactions is usually very great, a rise of 10° C. frequently doubling and sometimes tripling the velocity.[3] An example of this kind is afforded by gaseous hydrogen and oxygen, which do not combine at a measurable rate at 350° C., while at 600° C. the rate of combination is so rapid that an explosion results.

It seems that the velocity of reaction is nearly proportional to the square root of the absolute temperature, being accelerated by raising and retarded by lowering the temperature.

When applied to water supplies, low temperatures account for the taste, and in some instances for the odor of the hypochlorites in cold water, because the reaction is retarded to such an extent that a large portion of the hypochlorites enter the system intact, not having acted upon the bacteria or organic matters.

Applied to sewage effluents, a reduction in temperature due to dilution in streams or to cold weather would indicate that hypochlorites would be rendered ineffective because of their decreased reaction velocity and the high dilution to which they are subjected. Where sedimentation follows chlorination, the reaction would be retarded to such an extent by cold weather that a considerable portion of the hypochlorites would enter the stream intact, not having acted upon the organic matters or bacteria.

[3] Jones.

THEORY VS. PRACTISE.—It is apparent from the theoretical discussion that chlorinated lime is more efficient than liquid or gaseous chlorine, and that this agrees with practice is proven by the comparison of results obtained at the Pennypack Creek Disposal Plant at Philadelphia,[4] where it was found that even with proportionately larger amounts of gas it was seldom that *B. Coli* were not present in the final effluent.

The substantiation of the theory that the efficiency of chlorinating media is affected by various circumstances is found in the results obtained by the Ministerium of the Interior of Italy, published under the title "Tests on the Purification of Potable Waters by Means of Chloride of Lime."[5] These results may be tabulated as follows:

1. While a certain water infected with *B. Coli* is sterilized within 5 minutes by 2 p.p.m. Cl at 40° C. (104° F.), 6 p.p.m. are required at 5° C. (41° F.).

2. The addition of a small quantity of sterile sewage or of any organic matter to the water may reduce or inhibit the sterilizing action of chlorine.

3. Turbidity counteracts the action of chlorine; the turbid water of the Tiber is not sterilized by 70 to 80 p.p.m. Cl after three to four hours; but after filtration with a bacterial content of 70,000 to 80,000 per Cc., it is sterilized by 1 to 2 p.p.m. Cl in fifteen to twenty minutes. Small particles of whatever nature serve as protectors.

4. The salts in solution favor sterilization; hard waters are more easily sterilized than soft waters.

5. Chlorine may be regarded as initiating cytolysis in germ cells through oxidative (?) changes beginning on the surface and progressing towards the interior possibly accelerated by alkalinity and OH ions.

From the public health standpoint, chlorination as a means of sterilization is far from ideal, for its action is dependent upon too many uncontrollable circumstances, such as diffusion, the characteristics of the liquid and changes in temperature.

W. R. Copeland[6] calls attention to this feature as follows:

> The good results obtained in summer time create the impression in the minds of the average person that water treated with bleach or liquid chlorine is safe to drink at all times. As a matter of fact, quite the contrary may be

[4] *Mun. Jour.*, 3, 16, 19.
[5] *Ch. Abs.*, vol. 12, No. 4.
[6] *E.-N. Rec.*, 9, 16, 16.

the real truth, with the unfortunate result that epidemics of dysentery and typhoid fever sweep through communities that are living under a false sense of security.

CONCLUSIONS.—As the action of chlorine is dependent upon the liberation of nascent oxygen resulting from intermediate reactions, which are in turn affected by various conditions, it follows in logical sequence that the sterilization problem resolves itself into the removal of the intermediate reactions and the direct production of nascent oxygen in the water or sewage to be sterilized. This would obviate the undesirable conditions which render chlorinating media unsatisfactory.

DICHLORAMIN-T SOLVENTS.

BY ELMER H. HESSLER, P.D.

The germicidal properties of the halogens have been known for many years and their popular use and efficiency have been impaired only by their extreme chemical affinity and consequently their irritating nature. A comparison of their relative value shows a variance approximate to their atomic weights, beginning with fluorine as the most active, and then chlorine, bromine and iodine in succession. The European War, with its millions of casualties, necessitated the use of a very efficient and readily available antiseptic of exceptionally high germicidal power because of the unusual conditions encountered in military surgery.

Early in the war the attention of the surgeons was called to various solutions of the hypochlorites. The value of these solutions depended upon their neutrality and their available hypochlorite content ranging from 0.45 to 0.5 per cent. estimated as sodium hypochlorite. The solution which has been used most extensively is the Dakin-Carrel solution, made from chlorinated lime, monohydrated sodium carbonate and sodium bicarbonate. The solution is not stable and must be constantly assayed before use in order to insure its hypochlorite content as mentioned above. Above 0.5 per cent. of sodium hypochlorite it is irritating and below 0.45 per cent. it is valueless. This solution was used in surgery without dilution as an irrigating medium and its rapid decomposition in contact with the infected areas made its constant renewal necessary. If this was not

rigidly carried out the spent solution really became a veritable incubator for bacteria.

A little later Dakin introduced[1] chlorazene, or sodium paratoluenesulphochloramine ($C_6H_4CH_3SO_2NaNCl + 3H_2O$), a compound first made by Chattaway.[2] This compound is soluble in water and was extensively used until Dichloramin-T was introduced by Dakin in Europe and by Lee, Sweet and Lewis in the United States.

Dichloramin-T, or paratoluenesulphodichloramide ($C_6H_4CH_3SO_2NCl_2$), is a white to pale yellow powder or granule having a rather pleasant hypochlorous odor, soluble in chloroform, benzene, eucalyptol and paraffine oil, and insoluble in water. It is incompatible with alkalies and strong acids. It rapidly decomposes in the presence of the slightest moisture and of excessive heat and light. It is prepared from toluene passing through the successive compounds, paratoluenesulphonic acid, sodium paratoluenesulphonate, paratoluenesulphonchloride, paratoluenesulphonamide, and paratoluenesulphodichloramide.

When first introduced in this country[3] it was recommended to be used in solutions of chlorinated eucalyptol ranging from 2 to 20 per cent., subsequently diluted with chlorinated paraffin oil. The solutions were extremely unstable and especially so after the addition of the chlorinated paraffin oil. Chlorinated eucalyptol (Dakin) differed physically but very little from eucalyptol U. S. P., but contained varying amounts of combined chlorine ranging from 3 to 5 per cent. Using this alone as a solvent was unsatisfactory because of the lack of density, viscosity and its volatility. The addition of chlorinated paraffin oil remedied these faults, but as it destroyed the stability of the solution could not be considered the ideal means of using dichloramin-T.

The desire to arrive at a satisfactory solvent measuring up to all the requirements led to some original work by the Phipps Institute of the University of Pennsylvania and chlorinated eucalyptol 1.2 was introduced. This was prepared from eucalyptol U. S. P. by forcing chlorine into it at a temperature below 80° C. until the specific gravity of the mixture was 1.19 and on subsequent washing free from acid and drying with calcium chloride the finished product was a pale yellow oily liquid, specific gravity 1.2, with an odor a

[1] *British Medical Journal*, August 25, 1915, and January 29, 1916.
[2] *Trans. Chem. Soc.*, 1905, lxxxvii, 153.
[3] *Jr. A. M. A.*, July 7, 1917.

trifle more camphoraceous than eucalyptol U. S. P. This eucalyptol 1.2 was used as a single solvent in making 5 per cent. solutions for surgical work and was diluted with chlorinated paraffin oil only for naso-pharynx application where the eucalyptol would have been irritating. The constant use of these solutions made with the above solvents met with local irritation on some patients, due to the eucalyptol if not to partly decomposed solutions. Decomposition in dichloramin-T solutions is recognized by the presence of free chlorine or hydrochloric acid and a separation of crystals. Free chlorine or hydrochloric acid may be detected by holding an object moist with ammonia a short distance above the open bottle of solution.

The inability to obtain supplies of eucalyptol in England and the rather disappointing experience with the solutions prepared from the solvents in use was an incentive for further work on the part of Dakin and his associates and recently[4] chlorcosane was introduced, a chlorinated paraffin wax, containing from 45 to 55 per cent. of combined chlorine as a single solvent possessing in every way the properties ideal for a solvent of dichloramin-T in all its uses. It is a straw-colored oil, odorless, tasteless, slightly heavier than water and has a viscosity approximating that of castor oil.

Solutions of dichloramin-T are made by heating chlorcosane to 80° C. and then adding the dry dichloramin-T, which melts and goes into solution. To this is added a volume of chlorcosane equal to that heated to 80° C. and then the solution is filtered through paper. Solutions made in this way, observing the caution of using only perfectly dry utensils, will keep for two to three months or longer.

In using the solution the following should be observed: (*a*) Avoid direct sunlight; (*b*) if a precipitate appears which does not dissolve on warming the bottle to 80° C. the solution should be discarded; (*c*) any portion of solution poured from the bottle should never be returned to the bottle and neither should any applicators or instruments be inserted into the bottle; (*d*) remember that moisture, light and heat are arch enemies of the chemical and its solutions.

A specially constructed all-glass atomizer is the most satisfactory method of application, but it is necessary to refill the atomizer repeatedly with fresh solution and before doing so the atomizer should be cleansed with chloroform or carbon tetrachloride and dried.

[4] *A. Jr. Pharm.*, April, 1918, reprinted from the *Chemist and Druggist.*

Dichloramin-T has indeed proved itself a valuable antiseptic and now that the ideal solvent has been found its uses should be unlimited in combating bacterial infection. Splendid clinical results have been observed with the 5 per cent. solution in surgery and skin diseases, with the 2 per cent. solution in naso-pharynx affections, and with the 0.5 per cent. solution in ophthalmology.

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QUARTERLY REVIEW OF THE ADVANCES IN PHARMACY.

By John K. Thum, Ph.M., Lankenau Hospital, Philadelphia, Pa.

In the Paris letter dated March 28, appearing in the *Journal of the American Medical Association*, May 4, mention is made of a demonstration by Dr. Bazin at the Society of Biology of the results of comparative experiments between the antiseptic power of the boric acid-hypochlorite mixture, also known as Vincent's mixture, and that of tincture of iodine and iodoform. His first researches were in vitro and gave evidence that to inhibit the development of bacteria in a given bouillon culture required the use of 3 grams of Vincent's mixture, while to check the cultures in the same bouillon, 10 grams of tincture of iodine and 25 grams of iodoform were found necessary. In order to determine the comparative toxicity of these chemicals, Dr. Bazin introduced them into the peritoneal cavity of guinea pigs. The introduction of the Vincent's mixture into the cavity caused only a slight reaction, while on the other hand the application of the tincture of iodine and the introduction of weak doses of the iodoform resulted in the death of the animals. In skin wounds and other superficial wounds with suppuration after infection with dirt, the tincture of iodine and the Vincent's mixture seemed to give equal results; in wounds of the muscles soiled with dirt the Vincent mixture exhibited a quite noticeable superiority. Investigation also showed that in bone wounds the mixture was much more efficacious than the tincture of iodine. On the other hand iodoform showed at all times a decided inferiority.

The Pharmacology of Iodides.—Experimental studies were performed on the absorption of iodides from the digestive tract, their passage to the blood, and consequent elimination with the urine.

Investigation showed that iodides do not appear to be absorbed by the stomach at all. The iodide content in the blood rose after each dose and soon dropped, proving that to keep a patient under the influence of the iodide many doses at frequent intervals are necessary over an entire day. Elimination with the urine reaches its height in about two hours; of course, the length of the interval depends on the promptness with which the stomach contents are passed along. Whether the iodide is taken on a full or empty stomach makes considerable difference. When the patient is on a constant diet the drug does not seem to modify the viscosity of the blood; the literature on the action of this drug in this regard contains conflicting statements based on tests without control of the diet. The influence of iodides on the heart action failed to reveal any change in the blood pressure or pulse rate even when the blood contained amounts of the drug much above the therapeutic dosage. When the iodide content of the blood was advanced to a very high figure, the heart action was depressed and the blood pressure dropped, as the blood was thus rendered hypertonic. The investigator comes to the conclusion that the therapeutic action of iodides in circulatory disturbances has no experimental basis. Any benefits from its use at all suggests a syphilitic origin for the disturbance. (*Ugeskrift for Laeger*, No. 4, p. 139, 1918, by J. Buchholtz, through *J. A. M. A.*, April 20, 1918.)

Effects of Flavine in Wound Treatment.—In view of the publicity that flavine has had in the last few years from the military base hospitals as a surgical dressing, a recent report of its use cannot be without interest. All cases were dressed with a 1–1,000 solution of acriflavine in sterilized physiological salt solution. It was used to irrigate wounds at each change of dressings and also in gauze packs inserted in the wounds and in the outer gauze dressings. The cases treated were: (1) those in which infection and sepsis were active and not under control when treatment was begun; (2) those in which infection and sepsis had been controlled and repair had already begun before flavine was employed. In cases in which infection and sepsis were active and uncontrolled the use of flavine following suitable operative measures had no beneficial effect on the subsequent progress of the case in so far as control of sepsis is concerned. Any differences noticed were unfavorable. In quite a number of cases in which sepsis had already been controlled and

repair had begun flavine acted injuriously, mainly by producing an unhealthy granulating surface. While these conclusions do not prove that flavine is without powerful germicidal action in some experimental conditions, the investigator believes they show that its clinical use is not without untoward results. His observations have led him to abandon the use of flavine in his work altogether. Results were never good. (W. Pearson, *Lancet*, London, p. 370, March 9, 1918.)

UTILIZATION OF THE LABORATORIES OF OUR UNIVERSITIES.—It appears that the much needed synthetic chemicals, especially those that have proved their value, and which the teaching and research institutions in this country must certainly have if their work is to go on, are now being manufactured and supplied by the chemical laboratory of the University of Illinois. Nearly a dozen chemicals for which we had formerly to depend on foreign manufacturers for supplies were made in amounts the value of which is estimated to be $5,000 and were distributed among more than thirty laboratories and supply houses. We hear that the work of making these chemicals has since expanded and elaborated to such an extent that there are now available nearly 120 different products. To date $9,000 worth of these have been distributed outside the laboratory in amounts ranging from a few grams up to pounds.

These products have each been thoroughly tested in comparison with a well-known standard product, and have absolutely conformed to every requirement, and in many instances they have been found to be much better than the product that originally came from abroad. It is said that the synthesized chemicals turned out by this laboratory numbered among them dimethyl glyoxime, nitroso beta naphthol, cupferron, nitron and ninhydrin, all of some use in laboratory research work, and many others. It would be interesting to know what the "many others" might be.

SKILLED ADULTERATION.—The Food and Drug Department of Kentucky reports that the analysis of foods and drugs is becoming increasingly difficult all the time because of the skillful forms of adulteration practiced by the manufacturers of such commodities. It appears that they employ experts who have learned to sophisticate in the most scientific manner; indeed, the adulteration is often so cleverly accomplished that it is extremely difficult for the analyst to detect the fraud with any degree of certainty. It is often neces-

sary to perform many analyses of products of assured purity so as to determine the maximum limit of allowable variation of certain constituents. An increase of a very small per cent. in excess of water in a canned fruit or vegetable means more profit and its detection is often difficult if not impossible.

TEST FOR ARSENIC IN SODIUM SULPHATE.—The author claims that when this salt is dissolved in distilled water and a turbid solution results, it indicates the presence of arsenic. This can be proven by adding 5 grams of sulphuric acid and the same quantity of metallic zinc to 100 mils of distilled water. The container is then capped with a white filter-paper cap. This paper should be about four to five inches in diameter and moistened with a 1 per cent. solution of mercuric chloride and dried before used. The ends of the paper are turned downward over the neck of the bottle and held firmly in place in a manner most convenient to the operator. If, at the end of forty or fifty minutes, the paper still remains white, the reagents are considered pure. About 25 grams of the sodium sulphate are put in the bottle and is shaken until the salt is dissolved. If arsenic is present the paper will turn yellow and then brown, the intensity of the color, of course, being proportional to the amount of arsenic present. This production of color is caused by the hydrogen arsenide formed by contact with the nascent hydrogen. The investigator states that this test will be found of service in detecting very small amounts of arsenic in various drugs. As small a quantity as one hundredth of a milligram per cent. can be demonstrated. This test was particularly useful in detecting arsenic in cream of tartar. (*J. de Médecine de Bordeaux*, by P. Carlos, vol. 14, p. 88, through *Jour. A. M. A.*, February 23, 1918.)

CHEMICAL TESTS OF DRINKING WATER.—The writer of this article is of the opinion that the determination of the chloride in a drinking water is a safe test of its purity. He found that when this test was negative, the bacteriologic tests were always negative, too, and vice versa. When the chemical test showed that the water was good, the bacteriologic findings never showed that it was palpably bad. He always found the sodium chloride content between 8 and 17 mg. in the pure waters, while 15, 20 or 35 mg. showed manifest pollution. The author of this paper also claims that it is very important to know the average chloride content of the pure waters in the region. This can be determined in a few hours by

analysis of a certain number of the sources of the water. Such a procedure establishes the normal chloride content of the basin, so that any variation from this attracts attention at once. In one valley into which the troops came he rapidly determined that the standard for the pure water in the valley was 15 mg. sodium chloride; 0.5 mg. oxygen consumed by organic matters; the hydrotimetric degree, 31. On examination of eleven springs in this valley, nine showed this standard; one showed 20 mg. sodium chloride, undoubtedly a suggestion of contamination, and one showed 12 mg. with hydrotimetric degree of 27, this plainly suggesting flushing with insufficiently filtered rain water. Naturally these springs were not allowed to be used, and the bacteriologic findings showed at least 1,000 colon bacilli in each of these two springs, while in the others they ranged from zero to 20, and only in three reached the number of 100. (*Bulletin de l'Académie de Médecine,* Paris, March 5, 1918, 79, No. 9, by L. C. Maillard, through *Jour. A. M. A.,* April 27, 1918.)

Alkaloids of Ipecacuanha.—*Iso*emetine, which has heretofore been produced or isolated in the form of the benzoyl derivative, can now be produced by the reduction of methylpsychotrine; emetine is produced at the same time in conjunction with the stereoisomeride, as *iso*emetine is also known. The base and several salts have also been formed. *Iso*emetine can also be made by the methylation of *iso*cephaëline; on oxidation it yields methylpsychotrine and rubremetine. Attempts to isomerize it to emetine have so far failed. On complete methylation and degradation by Hoffmann's method it yields a methine which is isomeric with methylemetinemethine. Dr. H. H. Dale has found that *iso*emetine has about half the toxicity of emetine when given to rabbits intravenously, whereas on cats it is practically without any emetic effect whatever. In man it seems to be very well tolerated, but it does not appear to have any curative action in amœbic dysentery. (*Chemist and Druggist,* March 16, 1918, p. 44.)

Fats and Oils in B. P. Preparations.—Owing to the scarcity of fats and oils the General Medical Council has authorized certain alterations and amendments to the British Pharmacopœia, 1914, for conserving these world-wide important commodities. The changes were made in response to representations from the Food Controller and the Home Office Committee on Drug Supply. As a result the

following preparations were withdrawn from the Pharmacopœia until further notice: Linimentum camphoræ, linimentum chloroformi, linimentum hydrargyri, linimentum terebinthinæ aceticum, and liquor cresol saponatus. It was decreed that in the United Kingdom certain specified substances may be substituted for prepared lard and prepared suet for the preparation of official preparations; arachis (peanut) oil or sesame oil may be substituted for olive oil in official liniments, ointments, plasters, and soaps; and the use of the modified castor oil of commerce commonly known as "neutralized seconds castor oil" is now permitted in the manufacture of those official preparations for which hitherto castor oil was directed to be used.

THE NEW REMEDIES OF 1917.[1]

By Thos. Stephenson, Ph.C., F.R.S.Edin., Editor of "The Prescriber."

(*Continued from page 369*)

Emetine.—The problem in connection with the use of emetine has been its administration by the mouth in the case of dysentery carriers. Hypodermic injections of the hydrochloride do not reach the encysted form which inhabits the intestinal tract of carriers, and it is necessary to give *per os* some form of the alkaloid which is insoluble in the stomach, but soluble in the intestine. ***Emetine Bismuth Iodide*** is theoretically insoluble in the stomach, but it is by no means ideal, as it not infrequently gives rise to nausea and vomiting. When it is tolerated it seems to act most efficiently. The problem is how to secure tolerance, and various methods of exhibition have been tried. Keratin-coated tablets seem to offer no advantage; the best form of administration, so far, has proved to be salol-coated pills. The dose of "E.B.I." is 3 Gr., given each night, and a course consists of twelve doses.

Emetine Phosphotungstate has been suggested, but it is only a suggestion. Such a salt would decompose in the intestine into emetine and phosphotungstic acid, and the action of the latter may be deleterious.

The other alkaloid of ipecacuanha, ***Cephaëline,*** has been tried in cases of amœbic dysentery. While its action on the entamœba is equal to that of emetine, dose for dose, its action on the encysted organism appears to be more promising. Used subcutaneously,

[1] Reprinted from the *Pharmaceutical Journal and Pharmacist.*

cephaëline causes more irritation and pain, but there is less tendency to diarrhœa during treatment. The dose is the same as that of emetine, and the suggestion is that a combination of the two alkaloids would be more efficient than emetine alone.

HALAZONE, A NEW WATER STERILIZER.—The problem of sterilizing water for troops on the march has exercised the minds of those in authority. The hypochlorite method is useful only when troops are stationary. Chloramine-T requires a high concentration to effect the necessary sterilization, especially with hard alkaline waters, and this renders the water unpalatable. In presence of an acid, such as acetic or citric, a lower concentration is effective, but chloramine-T decomposes when kept in contact with an acid. An effective, stable, and inexpensive agent has been found in p-sulphondichlor-aminobenzoic acid, $Cl_2N.O_2S.C_6H_4.COOH$, one part of which in 300,000 will sterilize highly contaminated water. Tablets containing 4 Mg. of this substance, with sodium carbonate and sodium chloride, are used, and to these the name of *Halazone* has been given. Halazone tablets have been found to be sufficiently stable for all practical purposes. One tablet is usually sufficient to sterilize a liter of water.

COLLOIDAL SULPHUR.—The use of colloidal sulphur in rheumatism is on the increase, and as the preparation can easily be made by any pharmacist, a few lines may be devoted to this subject. The colloidal sulphur used with success by Major Comrie in cases of trench rheumatism is prepared as follows: Hydrochloric acid (10 per cent. HCl), 22 Cc.; sodium sulphide (Na_2S, $9H_2O$), 5 Gm.; sodium sulphite (Na_2SO_3, $7H_2O$), 2.6 Gm.; white of two eggs; sterilized water to one liter. Dissolve the sodium salts separately, each in 250 Cc. of the water, mix, add the white of egg, and mix thoroughly. Then add the hydrochloric acid, diluted with 250 Cc. of the water. Mix, warm slightly, and make up to one liter with sterile water. The solution is dialyzed, and is then ready for use. The strength is 1:1,000, and the commencing dose is 1 Cc., increased to 2 Cc., injected into the painful area of muscle, the point of injection being slightly varied each time. An injection is given every second day for three weeks, the alternate days being devoted to massage and hot alkaline baths.

SACCHARIN IN DIET.—An important communication by Mollière in *La Médecine pratique* (July) deals with the use of saccharin. He does not favor its too free use in the replacement of sugar, and

holds that its sale should be restricted. Its use might be permitted in liqueurs, syrups, and the like, on condition that the amount does not exceed one centigram to the tablespoonful, and that the exact amount is definitely stated on the label. It should not be used in cakes, and especially in those containing eggs. Saccharinated cakes and pastry are very indigestible.

With regard to its use medicinally, Mollière says that he has prescribed saccharin for over ten years, and has never yet found it to cause digestive trouble or toxic effects. He has, however, never prescribed more than 0.25 Gm. *per diem.* The success obtained by its use in the gastro-enteritis of infants has encouraged him to test its value in various forms of dyspepsia and of enteritis. He concludes that saccharin is a most useful aid in the treatment of gastro-intestinal infections. He does not believe that it is in any way injurious to the kidneys. Neither in dyspepsia nor in diabetes does it appear to have any bad effect, but Mollière has taken the precaution not to prescribe it in cases of albuminuria.

DISODO-LUARGOL.—The new arsenobenzol-silver-antimony compound *Luargol,* which has given good results as a substitute for salvarsan in syphilis and in malaria, was described in *The Chemist's Annual,* 1917, p. 48. The drug is given by intravenous injection, the dose being dissolved in an excess of caustic soda. A new soluble form of luargol has been introduced under the name of *Disodo-Luargol;* this is a definite sodium compound, freely soluble in water, giving a brown solution. The contents of an ampoule may be dissolved in sterile water and injected immediately without the necessity of filtration. Injection is made in the same way as in the case of salvarsan. The dose to commence is 0.05 Gm., this being gradually increased until, at the sixth injection, 0.3 Gm. is reached. Two injections per week are well tolerated.

THORIUM SODIO-CITRATE.—The double citrate of thorium and sodium, being opaque to the X-rays while soluble in water, is used in solution for pyelography. The solution is prepared as follows: Thorium nitrate, 10 Gm., is dissolved in distilled water and heated on the water-bath; 30 Cc. of sodium citrate solution (1:2) is then added slowly with constant agitation. The precipitate formed at first is redissolved in the excess of the alkali citrate solution. The liquid is then exactly neutralized with normal NaOH solution, and the volume made up to 100 Cc. with water. After filtration and

sterilization by boiling, the liquid is ready for use. A stronger solution is made in the same way, using the following quantities: Thorium nitrate, 1 Gm.; sodium citrate, 22.5 Gm.; water to make 100 Cc.

SODIUM DESOXYCHOLATE.—Wells (*British Medical Journal*, July 7) points out that bile salts have a solvent action on pneumococci, and suggests the use of sodium desoxycholate in the treatment of septic throats. The formula he recommends is: sodium desoxycholate, 2 per cent.; quinine hydrochloride, 0.25 per cent.; acriflavine, 1:2,000. This is used as a spray for the throat.

HYDROCHLORIC ACID IN NEURITIS.—It has been found by Sainsbury (*Lancet*, June 16) that strong hydrochloric acid (B.P.), applied to the skin along the line of the inflamed and painful nerve, has a remarkable effect in neuritis. The acid is applied by means of a wad of cotton wool (the fingers holding it being covered with vaseline) in a line 1½ inches wide, and left to dry, no dressing being required. Rapid relief is afforded, and the application may be repeated twice a week.

MISCELLANEOUS REMEDIES.—Among the minor new remedies that have appeared during 1917, the following may be briefly referred to:

Alcresta Ipecac is an absorption compound of the alkaloids of ipecacuanha with fuller's earth. It has been tried as a substitute for emetine, but without much success.

Arsenphenolamine Hydrochloride is the name adopted officially by the American Medical Association for salvarsan.

Apothesine is a local anæsthetic, described as cinnamyl diethylamino-propinol hydrochloride. It is used as a 0.5 per cent. solution in 0.4 per cent. sodium chloride solution with adrenalin, and is said to be non-toxic.

Anusan is a name given to certain proprietary remedies for the treatment of hæmorrhoids and rectal affections generally.

Cargentos is a colloidal silver oxide, recommended as a non-irritating antiseptic.

Citresia is magnesium acid citrate, a white powder having an acid taste. It is used as a laxative.

Diemenal is a French solution of colloidal manganese used in the treatment of malaria.

Glycarsenobenzol is a preparation for intramuscular injection in syphilis; it contains in each Cc.: novarsenolbenzol, 0.2 Gm.; guaiacol, 0.1 Gm.; stovaine, 0.1 Gm.

Iosorbol is a powder containing 10 per cent. of pure iodine in a basis of *Assorbol,* an absorbent vegetable powder.

Kephalin is the hæmostatic phosphatide obtained from spinal cord and brain tissue. A suspension containing 0.1 to 0.2 per cent. in normal saline solution is applied to bleeding or oozing surfaces.

Kinectine is a compound of quinine with hectine—quinine benzo-sulpho-para-amino-phenylarsonate. It is recommended in feverish conditions.

Methyl-phenol Serum is a serum impregnated with methylene blue and phenol. It is used as an intravenous injection in gonorrhœa.

Neoquinine is the name given to a French preparation, said to be quinine glycerophosphate.

Saurol is a sulphur-containing oil distilled from a shale found in Switzerland. It is advanced as a substitute for ichthyol.

Siomine is hexamine tetra-iodide $(CH_2)_6N_4I_4$. It contains 78.5 per cent. of iodine, and is put forward as a substitute for organic iodides, no therapeutic claim being made for the hexamine content. The dose is the same as that of potassium iodide. It is an American product.

Sofos is a mixture of sodium dihydrogen phosphate and sodium bicarbonate, rendered stable by coating the particles of one of the constituents with disodium hydrogen phosphate. When treated with water sofos forms nascent sodium phosphate, and liberates CO_2 with effervescence. Dose, 60 to 240 grains.

Stannoxyl is a preparation containing pure tin and tin oxide, recommended as a remedy for boils. The dose is 0.5 to 1.0 Gm. In some parts of France powdered tin is a popular remedy for boils, and this preparation is said to have a powerfully destructive action in staphylococcus infections.

ANTISEPTICS.[1]

A Short Account of the Work Done for the Medical Research Committee in the Pathological Department, Edinburgh University.

By Theodore Rettie, D.Sc.

In January, 1915, the National Insurance Medical Research Committee, at the request of the War Office, issued an appeal to the various medical schools to institute research on several problems which had been encountered in the medical service at the Front. One of the most urgent requirements was a reliable antiseptic for the treatment of heavily infected wounds, with special attention to spore-bearing organisms. Professors Lorrain Smith and Ritchie at once organized several sets of workers to investigate the various problems, under their own direction. The work on antiseptics was carried out by the Professors, Dr. A. Murray Drennan, now professor of clinical pathology in Otago, Dr. W. Campbell, now a captain in the R. A. M. C., stationed at Alexandria, and myself.[2]

It may seem strange that over forty years after the introduction of antiseptic surgery by Sir Joseph Lister no ideal antiseptic has been devised for such emergency treatment; the explanation, I think, is to be found in the tendency of modern surgery to leave as much to the recuperative power of the patient's own body as possible. In preparing for operation the surroundings of the patient are rendered as sterile as possible. Instruments, swabs, dressings, everything that will come in contact with him, are sterilized by heat, in fact nothing that is not sterile is allowed to touch him. Under such conditions the only antiseptic necessary is some iodine solution to sterilize the patient's skin, and lysol or such preparation in which to place instruments after use.

In accident cases where the wound is already infected, the injured tissues are carefully dissected out under chloroform and the wound cleansed with some strong antiseptic, and most often with 5 per cent. aqueous carbolic acid, Lister's original antiseptic, or, by some of the ultra-aseptic surgeons, with large douches of sterile saline (0.85 per cent. salt solution—this is known as normal saline

[1] From *The Journal of the Society of Chemical Industry*, January 31.
[2] Lorrain Smith, Drennan, Rettie, and Campbell, *B. M. J.*, 1915, 2, 129.

as its osmotic pressure is equal to the pressure of the plasma of the body). Such procedure, though successful with a limited number of patients, obviously cannot be applied in a casualty dressing station; the wounds are always contaminated: they are deep, often ramifying, and may contain pieces of clothing or splinters, all presumably carrying infection. To meet such conditions powerful remedies are necessary, but they must be discriminatingly powerful; microbes which are vegetable cells must be killed, both vegetative forms and spores, which are much more resistant. At the same time the animal cells of the tissues must be damaged as little as possible by the antiseptic; free drainage for all discharges from the wound must also be maintained.

In opposition to the antiseptic method there is what has been called the physiological method of wound treatment, introduced by Sir Almroth Wright. The wound is treated with a hypertonic saline solution, *i. e.*, a solution having an osmotic pressure higher than that of the plasma. As a result of this, fluid is rapidly poured out by the tissues, the idea being that the microbes are thus washed out of the wound and at the same time destroyed by the bactericidal properties of the lymph.

In support of this method the argument was advanced that any antiseptic damages the tissue to which it is applied to such an extent that the value of it as a destroyer of bacteria is lost, and the dead cells and coagulated albumin which the antiseptic leaves in the wound are a fertile source of further trouble. By hypertonic saline treatment this difficulty is avoided. With these two principles in mind, our object was to find an antiseptic agent thoroughly efficient as a killer of bacteria and spores, and at the same time harmless from the point of view of the wound tissues.

Our first step was to test the comparative efficiency of all the antiseptics in general use. It is obvious that it is impossible to make a definite statement as to the value of an antiseptic for wound treatment from its behavior under laboratory conditions. Most elaborate experimental methods have been devised in the endeavour to fix a standard by which antiseptics may be tested, but further research has shown that so many factors enter into the efficiency problem that test-tube methods have come to be regarded more or less as a compromise. For instance Chick and Martin[3] have shown that what might be called mass action, *i. e.*, the actual

[3] Chick and Martin, *Journal of Hygiene*, 1908, 8, 654.

number of bacteria exposed to the action of the antiseptic in the test tube, has a very important bearing on the efficiency. The presence of organic matter other than the bacteria with blood serum, whole blood, pus, muscle extract, etc., have been employed to reproduce as far as possible conditions likely to be met with in a wound. For our tests we decided to use pieces of heavily infected tissues which were exposed for definite periods to a large volume of the antiseptic solution. The tissue after treatment was washed free of the antiseptic with successive quantities of sterile water, and in cases where it was deemed necessary, any residual antiseptic was neutralized by appropriate chemical methods. The tissue was then put into a tube of sterile broth and incubated; readings were taken at 24, 48, and 72 hours.

The antiseptics tested were those in use at the military hospitals in Edinburgh and others which have been more or less in general use: they were phenol, acrosyl, kymol, chinosol (oxyquinoline potassium sulphonate), hydrogen peroxide, mercuric iodide, tincture of iodine, potassium permanganate 4 per cent., methylated spirit, turpentine, salicylic acid, sodium salicylate, methyl salicylate (oil of wintergreen), glycerin, bleaching powder, bleaching powder and hydrogen peroxide (for nascent oxygen), eau de Javelle, boric acid. Our test proved very drastic: of the above only bleaching powder, 10 per cent. solution, eau de Javelle (10 per cent. sodium hypochlorite), 5 per cent. phenol, and the mixture of bleaching powder and hydrogen peroxide had any effect in delaying or inhibiting growth, and the first two were decidedly ahead of the others. The hypochlorites were thus proved, as has often happened before, to be the strongest antiseptics in general use. There are other points decidedly in their favor. Bleaching powder is cheap, easily procured anywhere, and above all it cannot be classed as a dangerous poison. On the other hand pure liquor calcis chlorinatæ and eau de Javelle are very drastic remedies and on account of their strong alkalinity and high chlorine content (about 3 per cent. available chlorine) the tissues will not stand their continued application: for this reason they have never come into general use, though they have both been used with great success on occasion. For instance in 1846 Semelweiss, an Austrian physician, stamped out an epidemic of sepsis in his hospital in Vienna by using bleaching powder. Pasteur used liquor calcis chlorinatæ, and I am informed by Sir James Russell that when he was a medical student in this university Professor

Spence constantly used it. Our problem thus reduced itself to getting bleaching powder into a solution or powder that could be applied to open wounds without damaging the tissues unduly.

Following our original method, *i. e.*, with infected tissues, and using mixtures of varying proportions of boric acid and bleaching powder with small quantities of water, we found that with equal quantities of each we got a most pungent smelling paste which had no difficulty in sterilizing the tissue and on the other hand, apart from bleaching, did not seem to damage it as much as was expected. We also found that the gas (hypochlorous acid) given off by this mixture was capable of sterilizing highly infected tissue, provided it was allowed to act long enough; in some of the experiments two hours was sufficient. This mixture therefore gave promise of high value as a wound dressing, and I shall have occasion to refer to it later. Solutions prepared from this mixture were next tested and very interesting results were brought out; the bactericidal efficiency of the solution was greatly increased; instead of 3.5 per cent. available chlorine, as in liquor calcis chlorinatæ, one tenth of that amount gave very satisfactory results, the free hypochlorous acid proving a much better germicide than the calcium salt.

Further test experiments were carried out with anthrax spores, one of the most virulent and resistant of pathogenic organisms; we were gratified to find that our solution in a strength of 0.35 per cent. available chlorine killed the spores in one minute.

Turning next to the action on living tissues, working first on rabbits, then on ourselves, then on the patients in local hospitals, we were soon convinced that hypochlorous acid in a solution such as ours could be applied to tissues in a strength hitherto unsuspected. Large quantities of the solution can be applied to extensive wound surfaces, and may be freely introduced into the peritoneum or pleural cavity without producing any toxic effect; indeed the mixed powders may be introduced into wounds and even into the peritoneal cavity without damaging the tissues; such treatment has been found very effective in grossly infected wounds.

Pure hypochlorous acid in aqueous solution always contains free hydrochloric and chloric acids due to spontaneous decomposition, one molecule of hypochlorous acid being oxidized to chloric acid at the expense of other two molecules which are reduced to hydrochloric acid. Both are very strong acids and therefore pure hypochlorous acid is not suitable for wound treatment.

By adding boric acid to chlorinated lime in the proportions above stated we have produced a solution containing calcium biborate, an acid salt of extremely low hydrogen ion concentration; on mixing such a solution with one containing hydrochloric acid the acidity is reduced as the free H ions are taken up by the solution, therefore cannot rise above the dissociation constant for boric acid, which is very low.

By this adjustment various advantages have been secured: the alkalinity of the chloride of lime has been reduced, the full effect of the free hypochlorous acid has been secured, and the solution cannot become unduly acid. In virtue of this balance it follows that the solution can be applied freely to the tissues of the body, and that a considerable quantity can be injected into the circulating blood without harmful effect.

The high germicidal value of pure hypochlorous acid solutions was demonstrated in 1903 by Andrews and Orton.[4] In test-tube experiments they found that very weak solutions of hypochlorous acid, 1 part in 100,000, would kill pathogenic organisms in one minute but when applied to solutions containing organic matter as well as bacteria they found the hypochlorous acid so rapidly destroyed that they did not evolve any method of applying the solution as a practical antiseptic.

Putting all the above observations together we fixed on the following as safe antiseptics:

. The powder, equal weights of chloride of lime and boric acid. The solution, prepared by shaking up 25 Gm. of the above mixture in one liter of water and filtering off the sediment; this solution contains about 0.26 per cent. hypochlorous acid. The powder we named Eupad and the solution Eusol—words derived from the initial letters of Edinburgh University Pathology Department.

A simple and convenient method of preparing small quantities of eusol is to make it up from liquor calcis chlorinatæ, that is 10 per cent. chloride of lime; this solution, contrary to the statement in the Pharmacopœia, keeps very well if stored in a cool dark cupboard. I have kept it for months in the laboratory with a very small loss of chlorine. This solution may be made in quantity, say two liters, filtered clear, and the chlorine content determined; the amount necessary for one liter of eusol is easily calculated; with a

[4] F. W. Andrews and K. J. P. Orton, *Cent. f. Bakt.*, 1903–4, 35, Abt. 1, pp. 645 and 811.

good chloride of lime this should be about 125 Cc., which is diluted to one liter, and shaken with 10 Gm. of boric acid; the solution remains clear.

For testing we recommend $N/10$ sodium arsenite solution; this solution keeps better than sodium thiosulphate; it is also better for testing bleaching powder, as chlorates do not interfere with the result, as they do in the hydrochloric acid and potassium iodide method.

Another hypochlorite solution has also been introduced as an antiseptic. It is known as Dakin's[5] solution and contains sodium hypochlorite and sodium bicarbonate; its action is much the same as that of eusol but it is decidedly alkaline.

As eusol is a most powerful oxidizing agent it is evident that its value as an antiseptic will soon be reduced in contact with organic fluids such as are encountered in any open wound; therefore in order to bring any effective solution into contact with the organisms hidden in the depths of the wound, large quantities must be used and the solution got down to the lowest recesses and pockets. To accomplish this, surgeons have various appliances with rubber tubes branching from a common source of supply; this method was applied most successfully with eusol by Captain Miles[6] in Edinburgh and also by Captain John Fraser[7] in France. A similar method has been advocated by Carrel, who worked with Dakin's solution at Compiegne, and constitutes the Carrel-Dakin[8] method of wound treatment.

We have further observed in open wounds a distinct outpouring of lymph on the application of eusol, thus combining the advantages of the hypertonic saline treatment with the killing power of the hypochlorous acid; here also the nontoxicity of the solution tells strongly in its favor; there are no toxic by-products at all. Carbolic acid is an excellent antiseptic, but if applied to a wound in unlimited quantity it very soon produces necrosis and may even produce symptoms of general poisoning. The cresols and emulsions containing them precipitate a sticky film of resinous matter in the wound, clogging it and preventing free drainage.

[5] Dakin, *B. M. J.*, 1915, 2, 318.

[6] Miles, *Edin. Med. J.*, Feb., 1916.

[7] Fraser, *B. M. J.*, Oct. 9th, 1915, *Ed. Med. Journal*, Mar., 1916.

[8] Sherman, Hypochlorite Solutions for Wound Treatment, *B. M. J.*, 1916, 2, 621.

In the course of our preliminary experiments on the effect of eusol on live tissues we found that large quantities, as much as 40 to 50 Cc., could be injected into the blood stream of rabbits without injuring the animal; following up this line of investigation, with a view to attacking sepsis in the blood, we have met with a considerable measure of success. We applied this method of treatment in the first instance to a case of puerperal septicæmia in the Maternity Hospital in this city.[9] The patient was suffering from an extremely grave form of blood poisoning; the treatment was completely successful.

Following on this, Captain John Fraser, R. A. M. C.,[10] applied the same treatment to soldiers suffering from the acute toxæmia arising from wounds infected with the gas-producing organisms—*Bacillus Welchii, B. sporogenes,* etc. These organisms, which cause what is known as gas gangrene, owing to the fact that they produce large quantities of gas inside the tissues, are the scourge of the casualty clearing stations; they are spore-bearers and therefore difficult to kill and the spores are present everywhere.

In certain types of gas gangrene toxæmia, Captain Fraser found intravenous eusol as strikingly successful as in our first case, but in others it did not seem to have any effect; and this has been the experience of all workers who have employed the method. Sir Herbert Waterhouse,[11] in his report from Anglo-Russian Hospitals, says:

> We entertain the highest opinion of its value as a life-saving method in many apparently hopeless cases of septicæmia and pyæmia.

This treatment was the subject of much investigation under our own care at the Sick Children's Hospital in Edinburgh. A paper on the subject was published in the *Edinburgh Medical Journal*[12] this summer. As a result, we found that evidence of benefit was recorded in cases of lung infection such as broncho-pneumonia, empyæma, abscess of lung; in toxæmia from appendicitis, and in one case of toxic diarrhœa, also in cases of chronic meningitis. No benefit accrued in cases of rheumatism or in tuberculosis.

The problem we are now engaged on is to find out why in cer-

[9] Lorrain Smith, Ritchie and Rettie, *B. M. J.*, 1915, 2, p. 716.
[10] Fraser and Bates, *B. M. J.*, 1916, 1, 83.
[11] Sir H. Waterhouse and others, *B. M. J.*, 1917, 2, 441.
[12] Lorrain Smith, Ritchie and Rettie, *Ed. Med. Journal,* Sept., 1917.

tain bacterial infections we can help the recuperative powers of the body and in others we cannot. We may be acting on a toxin produced by the bacteria and circulating in the blood, or we may destroy some toxic agent formed by the blood itself, or may merely stimulate a protective reaction in the body fluids. Many theories have been advanced as to the conditions found in acute toxæmia. A toxin of protein origin has been held accountable. Again, an increase in the acidity of the blood, due to the production of butyric and kindred acids by the bacteria. A later suggestion by Wright is that the antitryptic power of the blood is reduced; this allows the trypsin to prepare a suitable medium for the growth of the bacteria in the blood itself and the patient is overwhelmed by an acute invasion of the actual organisms. The subject is much too large to enter into in a paper like this. I merely indicate it to show the sort of problems that the chemist is asked to solve in pathological or physiological chemistry.

Take the question of toxins. In a rabbit of 2 kilos weight there is, say, 100 Cc. of blood. Such a rabbit can stand without inconvenience, say, for a very safe estimate 20 Cc. eusol intravenously; this contains 0.05 Gm. HClO; obviously 0.05 Gm. of hypochlorous acid in 100 Cc. of blood can have no possible action as a direct antiseptic. On the other hand, ricin, a vegetable protein poison extracted from castor-oil beans, very closely resembling the bacterial toxins, when administered intravenously to a 2-kilogram rabbit in a dose of 0.001 Mgm., kills the animal. A very small amount of hypochlorous acid would suffice to neutralize this dose, if it could reach it.

Hitherto the treatment of conditions due to organic toxins has been based on the conception of a specific antidote; for example, take diphtheria. The method of treating the disease is to inject into the patient the serum of an animal which has been rendered highly immune to the diphtheria toxin. This serum has the power of neutralizing the toxin, but it is a specific power; it cannot neutralize the toxin produced by other organisms, *e. g.*, tetanus. The interest of the method of treatment by intravenous injection of hypochlorous acid lies in the fact that we are able to introduce into the blood a considerable quantity of a strong chemical reagent which will act in a general and not a specific manner.

The chemical reaction between hypochlorous acid and blood is naturally very complex. When hypochlorous acid or hypochlorites act on proteins, the first products are chloramines. In these com-

pounds, which have been studied by Chattaway, Langfield, and later by Dakin, chlorine displaces the hydrogen attached to the nitrogen, giving compounds containing the group NCl.

These substances give the reactions for free chlorine and are themselves antiseptics of considerable value. As they are formed in the wound or in the blood stream in intravenous injection, and may continue to exist as such for some time, they may prove to have an important bearing on the reactions of the body. They ultimately break down to aldehydes, nitriles, carbon dioxide, ammonia, etc. Work on these compounds as antiseptics has been carried out by H. D. Dakin[13] and others working in Professor Cohen's laboratory at Leeds, and two chloramine antiseptics have been prepared and are now in extensive use. They are known as chloramine T, which is p-toluene sodium sulphochloramide, $CH_3C_6H_4SO_2NaNCl$, and dichloramine T, toluene-p-sulphodichloramine, $CH_3C_6H_4SO_2NCl_2$ The former is soluble in water and is used in a strength of 0.5 per cent. The dichloramine is insoluble but dissolves in eucalyptol, which is then diluted with paraffin oil.

In the exigencies of war surgery a large variety of antiseptics, including several synthetic dyes, have been tested, but the general conclusion seems to be that hypochlorous acid, one of the oldest antiseptics, still remains the most reliable for general wound treatment.

In eusol the full value of hypochlorous acid is available without the drawbacks inherent in the earlier solutions containing this potent reagent.[14]

AMERICAN-MADE INDIGO.[1]

Indigo, the key to the dye situation in this country, now is being produced in commercial quantities and the solution of the American dye problem—acute since the imports from Germany were cut off—has been found. Not only is America now independent of Germany but we rapidly are moving into a position to hold the dye trade of the world after the war.

[13] Dakin and others, *Proc. Roy. Soc.*, 1916, B. 89, 232, and *B. M. J.*, 1917, 1, 865.

[14] For clinical trials with eusol see *Lancet*, February 5 and 12, 1916.

[1] From Publicity Bureau, E. I. du Pont de Nemours & Co.

These facts were brought out by Dr. Charles L. Reese, chemical director of the du Pont Company, in an address made before the cotton manufacturers of the United States at their recent convention in New York.

The dye problems have been solved, he said, and the du Ponts are at this moment turning out synthetic indigo of the best quality on such a large scale that the commercial success of the undertaking is assured. The laboratory problems were all solved long ago. The manufacturing difficulties now have been overcome and the production of this most important factor in the dye industry is going along according to the most up-to-date process at the company's big plant nearing completion at Deepwater Point, N. J.

Not only is indigo being made in quantity, but the plant is turning out all of the intermediates necessary for its production. In a very short time the indigo plant will be brought to its full capacity, which will supply all of the needs of the United States and Canada.

In addition to the production of indigo, Dr. Reese announced that his company soon will be manufacturing types of the finest basic, acid and direct colors, and a little later will put on the market the alizarine colors with their mostly needed derivatives, namely, the vat colors. Sulphur colors and chrome colors will be put on the market in a comparatively short time. He said that while it is not possible at the present to give definite dates, the plans are progressing very rapidly, considering the difficulties of securing machinery and raw materials, and we feel certain that we will make good our promise to become a large factor in making this country independent in the dyestuff industry.

OLIVE-OIL EMBARGO RELAXED.

The United States consul-general at Barcelona, Spain, cables:

Spanish government, by royal order published April 24, permits, upon application to the general direction of customs within ten days, the exportation of Spanish olive oil of recognized Spanish brands to American countries on the basis of shipments made to those countries during the five years from 1912 to 1916, no country being allowed more than its pro rata share. Shipment must be made in cans or bottles in the case of brands registered after July 31, 1914, or in any kind of containers for brands registered prior to that date.

An export tax of 30 pesetas will be levied on each 100 kilos net. All exports are subject to control and licenses are revocable at any time by the national commission on supplies. (Peseta, par value, $0.193; kilo, 2.2 pounds.)

[The embargo on olive oil of all grades was announced by the Spanish government on September 7, 1917. An export duty of 40 pesetas per 100 kilos was imposed.]

This Spanish decree, permitting export of olive oil under certain regulations, will serve to relieve to a moderate degree only the shortage of this prime necessity in the American market. The embargoes on the export of Italian and French olive oils, which have heretofore largely supplied the United States, have created an acute condition regarding supplies of olive oil, both edible and technical grades. The home production, largely in California, has developed some excellent grades of oil, but is as yet capable of supplying but a very small percentage of the needs of the country for this product. As a consequence olive oil of all grades has advanced to prices that were not thought possible.

VEGETABLE POWDER AS A LARVICIDE IN THE FIGHT AGAINST MOSQUITOES.[1]

A Preliminary Note.

By James K. Thibault, Jr. (Washington, D. C.),

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With the view to finding some larvicide cheaper than crude oil and just as effective, and at the same time available for use in certain places that can be neither oiled nor drained, such as water gardens, outdoor fish pools, rice fields and the like, I have experimented with many substances during the past few years. I have found not the perfect larvicide I sought, but one that meets at least a few of the requirements of perfection, and that I consider well worth a trial by those engaged in the work of exterminating mosquitoes. While not a substitute for oil under all conditions, it is certainly much cheaper than oil, as easy of application and, in

[1] From the Journal of the American Medical Association, April 27, 1918.

most cases, as effective as oil, and it can be used in places where oil would not serve the purpose.

The larvicide in question consists of various vegetable powders, including the familiar pyrethrum or insect powder of the stores. In fact, all my earlier work was done with the pyrethrum powder, which gave excellent results. But it was so expensive that, had it been generally used and recommended for this work, the cost would have become prohibitive within a short time. So I determined to find some similar powder possessing the good qualities of pyrethrum and at the same time being available to every one, and not subject to the speculative manipulations of the market.

As the larvicidal action of pyrethrum powder is purely mechanical, I considered it possible to produce a powder from the common weeds of the neighborhood that would be just as effective, and, indeed, I have found this to be the case. The weeds and grasses of nearly every species in the neighborhood, when dried and reduced to powder of the proper fineness, gave very good results, and it is not at all necessary to select any particular species in order to produce an effective powder.

A good powder should spread quickly and evenly over the surface of water even if thrown on by the handful, pushing the resulting film to all parts of the surface to be treated. It is, however, much more potent when applied in the form of a spray over the entire area of the larger pools. The covering capacity should be from 3,500 to more than 4,000 square feet per pound of powder.

Perhaps the greatest disadvantage in the use of the powder is its short period of effectiveness—probably only a few minutes—but it is so deadly that, once the larvæ come in contact with it, they die in a few minutes, even when immediately removed to another receptacle. The powder loses its effectiveness as soon as it is thoroughly wet.

I have found it very effective for killing such well-known species as *Anopheles quadrimaculatus, Culex quinquefasciatus, Culex abominator, Aedes coclumbiæ* and *Psorophora cyanescens.* Of these the species with short, thick air tubes such as *Anopheles, Aedes* and *Psorophora* are easily killed, while the species of *Culex* with very long, slender tubes are more resistant, *Culex abominator* being the most resistant species I have had to deal with.

These studies have been made in connection with the work of this bureau on the relation of mosquitoes and malaria to agriculture, under the general supervision of Dr. W. D. Hunter, with Mr. D. L. VanDine in charge of the field work.

SUGARLESS EFFERVESCENTS.[1]

The increased supplies of saccharin at more moderate prices make it now possible to use saccharin as a sweetener in effervescing preparations, the demand for which will increase with the advent of spring. The unsweetened effervescents which have been offered in certain quarters have not met with a ready acceptance by the public, and if the trade in these preparations is to be retained it is necessary that the substitute should resemble the original article as nearly as possible. On this account we publish the following recipes which were devised by Professor John Attfield some years ago:

SODII CITRO-TARTARAS EFFERVESCENS

Sodium bicarbonate	17 oz.
Tartaric acid	9 oz.
Citric acid	6 oz.
Saccharin	8 gr.

Mix the powders thoroughly, place them in a dish or pan of suitable form, heat to between 200° and 220° F., and when the particles of the powder begin to aggregate stir them assiduously until they assume a granular form; then by means of suitable sieves separate the granules of uniform and most convenient size and preserve the preparation in well-closed bottles.

The usual dose of this saccharinated preparation is one to two small teaspoonfuls, it being somewhat stronger than the article containing sugar. The formula given above would in the ordinary way include five ounces of sugar, and part at least of this bulk may be made up by employing dried sodium sulphate, but as this increases the activity of the preparation, the dose is best kept at the quantity stated above. For summer trade the following are useful:

GINGER-BEER POWDERS.

A.

Ginger in powder	60 gr.
Sodium bicarbonate	300 gr.
Saccharin	4 gr.
Oil of lemon	8 min.

Mix thoroughly. Divide into twelve equal portions, wrapping each in blue paper.

[1] From *The Chemist and Druggist*, April 20, 1918.

B.

Tartaric acid (in powder) ..... 360 gr.

Divide into twelve equal portions, wrapping each in white paper.

Directions for use: Mix the contents of a blue packet with a tumblerful of water; add the contents of a white packet; stir, and drink during effervescence.

LEMONADE POWDERS.

A.

Sodium bicarbonate ..... 300 gr.
Saccharin ..... 4 gr.
Oil of lemon ..... 15 min.

Mix thoroughly. Divide into twelve equal portions, wrapping each in blue paper.

B.

Tartaric acid (in powder) ..... 360 gr.

Divide into twelve equal portions, wrapping each in white paper.

Directions: As for ginger-beer powders.

SHERBET.

Sodium bicarbonate ..... 5 oz.
Tartaric acid ..... 5 oz.
Saccharin ..... 24 gr.

Dry the bicarbonate and acid separately. Mix the saccharin with the dry bicarbonate, and add—

Oil of lemon ..... 60 min.

Add the tartaric acid and mix. Preserve the sherbet in a dry, well-corked bottle.

In regard to the use of saccharin in place of sugar, the question of its alleged harmfulness it still being raised by people who are unmindful of the fact that saccharin was exhaustively tested physiologically over thirty years ago and found to be harmless to the human economy. For many years saccharin has been employed in aërated waters and as a sweetening agent in diabetic dietary without ill effect. Within the past two years larger quantities have been consumed than ever before, and so far no case has been brought forward of any harm that has resulted.

FIXING OF THE RESALE PRICES OF ARTICLES TO BE FORBIDDEN BY FEDERAL TRADE COMMISSION.

The Federal Trade Commission has issued the following formal statement of its policy on the question of fixing resale prices, a subject that has long been a matter of contention and of extended litigation affecting the drug trade.

For a considerable time there has been a controversy throughout the country over the question of the right of manufacturers, wholesalers, etc., fixing resale prices at which their articles could be sold, and the right to maintain such resale prices has been contended for by them, and the question whether such right exists has been brought before the Federal Trade Commission numerous times.

Many hearings have been had, many complaints have been made, and much consideration has been given to the subject by that commission. Many business concerns have been refusing to sell to customers who would not agree to maintain the resale price fixed by the seller.

First Case Disposed of.—The Federal Trade Commission has just disposed of the first of these cases in which complaints have been issued charging violations of law through fixing the resale price of articles, and an order to cease and desist from this practice has just been issued by it in the case of Chester Kent & Co. (Inc.), of Boston, manufacturers of proprietary medicines.

Attorneys for the company admitted that in the past the practices complained of had been in use. The order, the first in cases of this character, forbids the company to—

(*a*) Indicate to dealers the prices for which its proprietary or patent medicines shall be resold.

(*b*) Securing agreements from dealers to adhere to such prices.

(*c*) Refusing to sell to dealers who fail to adhere to such prices.

(*d*) Refusing to sell to dealers who fail to adhere to such prices upon the same terms as dealers who do so adhere.

(*e*) Furnishing any advantage to dealers who adhere to the resale prices, while refusing similar treatment to dealers who do not adhere to the prices.

This order of the commission follows the decision of the Supreme Court of the United States in the American Graphophone Co. case lately decided by it.

Some of the most distinguished lawyers in the United States have appeared before the commission to argue this question, as well as many of the leading business concerns of the country, some of whom have insisted that the maintenance of resale prices was proper, and others who have contended that it was not. Almost all of the large department stores of the country have been heard in opposition to it.

After full consideration the Federal Trade Commission has decided to issue complaints against all business concerns who refuse to sell unless the purchaser will agree to maintain a resale price fixed by the seller. The case just decided is the first formal finding by the commission to that effect. When once an article has passed from the maker to a purchaser he owns it, and the owner of such article may sell it at any price that he chooses, provided he does not himself sell it at such price as to be below cost, and thus thereby enter into unfair competition with other retailers selling the same article.

CONGRESS MAY HAVE TO ACT.—This decision is going to be open to considerable controversy in relation to the subject matter thereof, and the matter will probably have to be settled by an act of Congress in the manner suggested by Mr. Justice Brandeis in his concurring opinion in the Supreme Court of the United States, in the case of the American Graphophone Co. The Stephens bill, which is now in Congress, is in relation to that matter, but in the estimation of many business men and others it is thought to be broader than it should be. It may be that resale prices can be so regulated by placing the power somewhere protecting against unfair prices as to make it work equitably, and be a fair method of competition in commerce, but that question will undoubtedly have to be settled by congressional action.

COD-LIVER OIL FROM NEWFOUNDLAND.[1]

Large quantities of cod-liver oil are produced in Newfoundland as a by-product of the fishing industry, but the quality of the refined oil was formerly much inferior to that prepared in Norway, and the Newfoundland oil was consequently not greatly esteemed in the United Kingdom for medicinal purposes.

[1] March Issue of *Chamber of Commerce Journal*, London, England. Reprinted from *Commerce Reports*, April 23, 1918.

Considerable attention has, however, been devoted recently in Newfoundland to the improvement of the quality of the cod-liver oil produced in the island. In 1910 the government procured the services of a Norwegian expert, who has been engaged in the manufacture of cod-liver oil in the Lofoden Islands, to instruct the Newfoundland refiners in the methods of preparing the finest oil. A system of government inspection of oil refineries was also introduced, and in May, 1916, an "Act respecting the refining of cod-liver oil" was passed by which it was made compulsory for every refiner of the oil in Newfoundland to obtain a license and to observe certain rules and regulations in the preparation of the oil. Under the provisions of this act no refined cod-liver oil is now allowed to be exported from Newfoundland without having been inspected and branded by a government officer. The result of these measures has been to bring about a great improvement in the quality of Newfoundland cod-liver oil, and it is claimed that the refined oil is now equal to the best Norwegian oil.

The production of refined cod-liver oil in Newfoundland has increased considerably in the last few years, but the bulk of the oil obtained is still of common quality. In 1913–14, 1,054,208 gallons of common cod oil were exported from Newfoundland, as contrasted with 26,218 gallons of refined; in 1914–15, 1,239,040 gallons of common against 47,170 gallons of refined; and in 1915–16, 1,313,280 gallons of common against 142,637 gallons of refined. It is evident that a much greater output of the refined oil is possible if satisfactory markets can be found for the product.

CURRENT LITERATURE.

SCIENTIFIC AND TECHNICAL ABSTRACTS.

DESTRUCTION OF THE ORGANIC MATTER IN URINE.—Two Grms. of magnesium nitrate are dissolved in 20 Cc. of the urine, and the solution evaporated gently until a yellowish-brown residue is obtained. This is strongly ignited, and the charcoal then rapidly burns to a white residue. The amounts of sulphur estimated in the residue agree closely with those obtained by fusion with the ordinary fusion mixtures, and the method has the advantage that the oxidation proceeds less violently, and that less foreign material is introduced. Calcium nitrate may be used instead of magnesium nitrate, but is less rapid in its action. (L. Cordier, *J. Pharm. Chim.*, 1917, 16, 363–367. From *The Analyst.*)

CATALYTICAL BLEACHING OF OILS.—The use of catalytic agents, such as finely divided nickel in the hydrogenation of oils, says the *Oil and Color Trade Journal,* 53 (1918), 123, having proved so successful, it is probable that the employment of these in other directions may follow as a matter of course. In the bleaching of oils, for instance, catalytic agents such as finely divided lead and animal charcoal have been of service, as well as oleate of manganese, etc. In a paper recently published in a contemporary, experiments were described showing the influence of several catalytic agents upon tallow, palm oil and beeswax when a current of air is blown through the melted material. The catalysts employed were air-bleached palm oil, oleates of manganese, copper, cobalt, lead, iron and nickel, the silkstone soap of A. Finlay and Company, Belfast, and the cobalt soap preparation from the latter. In the case of the palm oil, bleaching occurred both with and without the catalysts, but with the latter the time requisite for bleaching was shortened, especially with cobalt and manganese salts. The experiments with beeswax and tallow were not so successful. (From the *Journal of Industrial and Engineering Chemistry.*)

TEST FOR ALBUMIN IN BODY FLUIDS.—Leone's reagent superposes the precipitating properties of three precipitants. He pours

into 100 Cc. of distilled water, heated, 10 Gm. of potassium bichromate. After filtering and cooling, 100 drops of glacial acetic acid are added and, a few minutes later, 100 drops of a 25 per cent. solution of pure sulphuric acid. Of the reagent thus prepared, 5 Cc. are transferred to a test tube. Then the urine or other protein solution under examination is added with a pipette. At the zone of contact a whitish ring forms. When there is much albumin present, delicate whitish threads can be seen extending down into the fluid below like wisps of smoke. The reaction occurs at once or in four or five minutes. There may be further two zones of precipitation, separated by a limpid zone. The reaction is not modified by the presence of iodine, mercury or salicylates in the urine. From the intensity of the whitish ring, its height and the rapidity with which it forms, the proportion of albumin present can be estimated. If there is no albumin a brown ring forms from the combination of the urea with the reagent. When the whitish ring forms at once, with only a few Cc. of urine, there is always more than 0.5 per thousand albumin present. If the ring takes several minutes to form, there are only a few Mg. of albumin. (From the *Policlinico, Rome,* through *The Journal of the American Medical Association.*)

Determination of Lactic Acid in the Presence of Other Organic Acids.—On oxidation with chromic acid, lactic acid yields acetic acid, carbon dioxide, and water, whilst other organic acids, such as tartaric, citric, malic, and oxalic acids, give only carbon dioxide and water. After volatile substances (volatile acids, alcohol, esters, etc.) have been distilled off, a portion of the residual solution corresponding with about 40 Cc. of $N/1$ sodium hydroxide solution is treated with 30 Cc. of 50 per cent. chromic acid solution and 20 Cc. of dilute sulphuric acid, the mixture is diluted to 100 Cc., boiled under a reflux condenser for 15 minutes, cooled, and the acetic acid formed is separated by distillation, and titrated. About 3 per cent. of the lactic acid present is destroyed completely by the oxidation, and the results calculated from the acetic acid found are correspondingly low. A small portion of the lactic acid distils over with the volatile acids. If only acetic and formic acids are also present, it is possible to determine this quantity of lactic acid by titrating the distillate and determining the molecular equivalents of

the acids in the usual way; the formic acid must, of course, be determined separately. (P. Szeberenyi *Z anal. Chem.*, 1918, 56, 505–506. From the *Journal of the Society of Chemical Industry.*)

COMPARATIVE EXAMINATION OF PURE AND COMMERCIAL INULINS.—Under the influence of diastases inulin is decomposed within the chicory root, with the formation of new compounds, termed inulides. These do not reduce Fehling's solution, but are attacked by the hydrolytic diastases in yeasts, which transform them into fermentable reducible sugars. On the other hand, pure inulin is not attacked by active yeasts or by S. Pombe. Comparative tests with samples of pure and commercial inulins, in which 1 Gm. of the sterilized samples was treated with 25 Cc. of yeast water of different origin, showed that the method was capable of detecting the presence of inulides. Pure inulin yielded 0.007 per cent. of alcohol, whilst commercial French inulin yielded 0.045 per cent., and German inulin 0.310 per cent. of alcohol when fermented with S. Pombe, —J. Wolff and B. Geslin. (*Ann. Chim. anal.*, 1917, 22, 241–242.) From *The Analyst.*

CONSTITUENTS OF FORMOSAN LEMON GRASS OIL.—The terpene isolated from lemon grass oil from Formosa gave, on reduction with sodium and alcohol, a derivative corresponding closely with dihydromyrcene, yielding dihydromyrcene tetrabromide, m. pt. 87°–88° C. It was further reduced by hydrogen and platinum to 2.6-dimethyloctane. On oxidation with alkaline permanganate it yielded succinic and oxalic acids. The identification of this terpene with myrcene is considered complete. In addition, the oil contains an aldehydic substance, other than citral, which has not yet been isolated. (*J. Chem. Ind.*, Tokyo.) From *The Journal of the Society of Chemical Industry*, February 15, 1918.

DELICATE REACTION OF THE NITRILES.—When a solution of a nitrile (aliphatic or aromatic) is treated with an equal volume of hydrogen peroxide (12 vols. per cent.) and 2 or 3 drops of a 5 per cent. solution of ferric chloride, hydrogen cyanide is produced on boiling. This can be detected by test papers made by treating filter-paper with picric acid (1 per cent.), drying, and then immersing the

paper in a 10 per cent. solution of sodium carbonate. If much nitrile is present the paper turns blue, but with smaller quantities a red or brownish-red coloration is observed. Very small quantities of nitrile can be detected in this way.—S. Dezani. (*Atti R. Acad. Sci. Torino*, 1917, 52, 826–833.) From *The Analyst*.

PREPARATION OF TANNIC ACID, GALLIC ACID, AND PYROGALLOL.—Tannin was extracted from Japanese gall nuts by four successive treatments with water at 20° to 30° C., and the residue was pressed. In this way a 13 per cent. solution of tannin containing 82 per cent. of the theoretical quantity was obtained. Tannic acid was prepared by concentrating the extract to 20 per cent., extracting it with half its volume of ether, and evaporating the ethereal extract. About 75 per cent. of the tannin in the aqueous extract was obtained. For the preparation of gallic acid the residual solution from the tannic acid preparation was concentrated to 20 per cent., and treated with 15 to 20 per cent. (by vol.) of sulphuric acid (66° B., sp. gr. 1.84), and the precipitated black mass was dissolved in water, decolorized with animal charcoal, and finally recrystallized from water. The yield was 62 per cent. of the tannin contained in the residual solution. Pyrogallol was prepared by heating the crude gallic acid with about 3 times its volume of water in an autoclave at 210° C. The crude product (yield, 63.5 per cent. of the gallic acid) was purified by crystallization from pure benzene.—M. Mito. Kogyo-Kwagaku-Zasshi (*J. Chem. Ind.*, Tokyo), 1917, 20, 720–736.

ESSENTIAL OIL OF ARTEMISIA ANNUA.—The work of Imada on the essential oil of *Artemisia annua* has been extended. The oil used had the following characteristics: Sp. gr. at 16°/4° C. 0.907798; optical rotation, 16.19°; acid value 1.82; ester value, 34.58; ester value after acetylation, 63.54. A minute quantity of an oil with an odor of cumic aldehyde was extracted by sodium bisulphite solution. The remainder was steam-distilled, yielding an oil of low specific gravity. The brown residue, amounting to about one fifth of the original oil, distilled between 128° and 182° C. at 10 Mm. pressure. The fraction of the light oil distilling from 176° to 181° C. contained cineol. The fraction distilling from 181° to 190° C. contained a ketone yielding a semicarbazone melting at 96° C., from which concentrated hydrochloric acid regenerated the pure ketone, having

the formula C 10, H 16, O, boiling at 71°–75° C. at 11 Mm., and at 182° at 760 Mm. Its sp. gr. at 14°/4° C. was 0.8906, refractive index 1.4695 at 18.5° C., and it was optically inactive.

Catalytic reduction of hydrogen yielded a tetrahydroketone, forming a semicarbazone melting at 134°–135° C. The pure tetrahydroartemisia-ketone boiled at 73° C. at 15 Mm., and at 173° C. at 760 Mm.; sp. gr. at 19.5°/4° C., 0.8262, and refractive index, 1.42425. The higher-boiling fractions of the oil (190°–210° C.) yielded a semicarbazone melting at 236°–237° C., which when treated with dilute sulphuric acid yielded a solid ketone, m. pt. 175° C., with all the properties of l-camphor.—Asahina and Yoshitomi. (*J. Pharm. Soc. Japan,* 1917, No. 424, 1. *Perf. and Essent. Oil Rec.,* 1917, 8, 353–354. From *Journal of the Society of Chemical Industry,* February 15, 1918.

Determination of Metallic Iron in Ferrum Reductum.—The author finds that the simple method described by Winkler (*Z. angew. Chem.,* 1917, 64) is not trustworthy, since the increase in weight of the sample does not attain a constant value even after the ignition in air for 15–20 minutes has been repeated five or ten times; moreover, by the prolonged ignition the triferric tetroxide originally present in the ferrum reductum is partially converted into ferric oxide, with the result that the percentage of metallic iron found is too high. The author has examined the official methods adopted in different countries. He recommends that in addition to the total iron, the metallic iron be estimated by Merck's mercuric chloride method; 25 Cc. of the filtrate should be used, the solution of potassium permanganate should be dilute (2–2.5 Gm. per liter), and the confirmatory iodometric estimation may be omitted. The author has examined a method in which bromine instead of iodine is used for the solution and estimation of the iron. The method fails on account of the unavoidable loss of bromine vapor during the estimation.—A. Eberhard. (*Arch. Pharm.,* 1917, 255, 357–381.) From *Journal of the Society of Chemical Industry,* January 31, 1918.

Detection and Estimation of Zinc in Water.—The film test will detect 1 part of zinc in 200,000 if it is present as bicarbonate, but where it is present in other combinations the test fails. The opalescence test with ammonium sulphide as reagent will detect 1 part in 100,000, and with ferrocyanide as reagent may detect 1 part

in 1,000,000 if certain conditions can be secured. It is pointed out that if a sample of water contains both zinc and visible matter in suspension, most of the zinc will be found to be in suspension and not in solution.

The test with ammonium sulphide is made as follows: To 100 Cc. of the sample contained in a test mixer, 1 Cc. hydrochloric acid is added, and, after shaking, 2 Cc. of ammonium sulphide solution. Simultaneously 100 Cc. of zinc-free tap-water is similarly treated. If at the end of fifteen minutes no difference can be seen between the sample and the tap-water, the sample contains less than 1 part of zinc in 100,000. If the sample develops a visible opalescence, the presence of zinc cannot necessarily be inferred. A further portion of the sample must be freed from iron and alumina, and then tested as described and the opalescence compared with that developed in standard solutions of known zinc content.

The ferrocyanide test should be applied twice to waters carrying suspended matter, first to 100 Cc. of the unfiltered water, and then to 100 Cc. of the filtered water. To 100 Cc. of the sample 1 Cc. of dilute (1:5) hydrochloric acid is added, and after a minute 1 Cc. of a 1 per cent. solution of potassium ferrocyanide not more than a few hours old. The opalescence, if any, produced is compared with standards in the usual manner, but to detect 1 part in 1,000,000 or estimate larger quantities accurately the standards must be prepared from water very similar except that it is zinc free. Sometimes the same water, before contamination by zinc, is available. In other cases, if the sample has been analyzed, an approximately similar solution can be prepared artificially. The use of distilled water for standards may lead to over-estimation of the zinc by as much as 100 per cent. (R. Meldrum, *Chem. News*, 1917, 116, 271–272, 295–296. From *The Analyst*.)

Separation and Estimation of Lactic, Succinic, and Malic Acids in Wines.—The method of separation of these acids from other acids in wine depends on their solubility in a mixture of alcohol and ether; the acids are then separated from one another by making use of the different solubilities of their calcium salts in alcohol. Fifty Cc. of the wine are neutralized with N/1 potassium hydroxide solution, and a quantity of 5 per cent. mercuric acetate solution is added just sufficient to precipitate the tannins; the mixture is heated to 50° C. and filtered, the insoluble portion being

washed twice with hot water. To the filtrate is then added N/1 sulphuric acid equal in volume to the quantity of N/1 potassium hydroxide solution, together with an amount equivalent to the difference between the total alkalinity of the ash expressed as potassium bitartrate corresponding with the amount of total tartaric acid in the wine. The solution is now evaporated to a syrup, water is added, and the evaporation repeated so as to expel all volatile acids. The residue is treated with a few drops of water, 2 Grms. of animal charcoal, and a quantity of sand; 25 Cc. of 95 per cent. alcohol are added, and the mixture is extracted with 50 Cc. of ether. After the ethereal solution has been decanted through a filter, the extraction is continued with successive quantities of 15 Cc. of a mixture of equal volumes of alcohol and ether. The extract is then evaporated to about 5 Cc., 0.2 Grm. of animal charcoal and 10 Cc. of water are added, the mixture is filtered, and the precipitate washed with a small quantity of hot water. The filtrate is concentrated, neutralized, while boiling, with alkali (calcium hydroxide) solution, again evaporated to about 8 Cc., and treated with one drop of 50 per cent. acetic acid and 90 Cc. of warm 95 per cent. alcohol. The mixture is heated to boiling, filtered, and the precipitate of calcium malate and succinate washed with 85 per cent. alcohol. An estimation of calcium in the filtrate gives the corresponding quantity of lactic acid. The precipitate is then dissolved in boiling water (a small quantity of calcium phosphate may remain insoluble), the solution is evaporated to 8 Cc., 1 Cc. of glacial acetic acid and 90 Cc. of 95 per cent. alcohol are added, the mixture is boiled, and the precipitated calcium malate collected on a filter and washed with warm 85 per cent. alcohol containing a trace of acetic acid. The quantities of calcium in the precipitate and filtrate give the amounts of malic and succinic acids respectively. Citric acid, if present in the wine, is precipitated with the calcium malate. In the case of sweet wines, the wine after neutralization, removal of tannins, and treatment with sulphuric acid, is evaporated to a syrup, and the latter is extracted several times with a mixture of 20 Cc. of alcohol and 50 Cc. of ether. The extract is then evaporated and treated as described. In normal wines, the succinic acid content is usually about 0.70 Grm. per liter; the quantities of lactic and malic acids vary considerably according to the origin and nature of the wine. (J. Laborde, *Comptes rend.*, 1917, 165, 793–795. From *The Analyst.*)

ESTIMATION OF SULPHO ETHERS IN URINE.—In Salkowski's method (*Virchow's Arch.*, 79, 552) metallic sulphates are estimated by precipitation with barium hydroxide and barium chloride and treatment of the precipitate with dilute nitric acid, whilst the combined sulphonated compounds, which are present in the filtrate as barium salts, are decomposed by boiling with hydrochloric acid and then precipitated with barium chloride. According to Gauvin (*Bull. des Soc. Pharm.*, June, 1914), a portion of the sulphonated ethers remains in the barium precipitate after the acid treatment, so that the results obtained by Salkowski's method are too low. This may be obviated by precipitating the sulphates alone, and then estimating the total sulphur compounds in another portion of the urine after hydrolysis by boiling for fifteen minutes with a fifth part of its volume of hydrochloric acid. The sulphur in the sulphonated ethers is then found by difference. The results thus obtained are from 6.5 to 8.6 per cent. higher than those given by Salkowski's method. Extension of the period of heating during the hydrolysis does not cause the results to be appreciably higher. (L. Cordier, *J. Pharm. Chim.*, 1917, 16, 360. From *The Analyst.*)

PURIFICATION OF WATER WITH ISOTONIC SODIUM HYPOCHLORITE SOLUTION.—Fralick has proposed and demonstrated the use of two chemicals for water purification in emergency outfits (Lister bags), so as to produce a safe water, entirely free from objectionable tastes and odors. To do this he has recommended the use of the isotonic sodium hypochlorite solution as a disinfection and the neutralization of the excess sodium hypochlorite by peroxid of hydrogen sodium hypochlorite + hydrogen dioxid = sodium chlorid + water + 2O, while the effectiveness of this method had been repeatedly demonstrated at his laboratory, field tests under army conditions were conducted and the testimony of a number of sanitary experts obtained. There was a unanimous opinion expressed that water neutralized with the hydrogen dioxid was entirely free from any objectionable or even noticeable taste or odor, while bacterial tests demonstrated its freedom from micro-organisms. In view of the disagreeable and probable injurious qualities of water disinfected with calcium hypochlorite, in emergency outfits (Lister bags), and in view of the fact that troops avoid drinking this water, Fralick recommends its discontinuance. (*Medical Record of New York* through *Journal American Medical Association.*

OLEIC ACID CONTAMINATED WITH IRON CAUSES SPONTANEOUS COMBUSTION.—In a technical process, fibers were oiled with oleic acid and then conveyed to bins in a current of air. Spontaneous combustion ensued. The oleic acid was found to have a normal iodine value, and other tests revealed nothing of a suspicious nature. It contained, however, iron equivalent to 0.1 per cent. of ferric oxide. This was proved to act as a catalyzer in promoting oxidation. This degree of contamination with iron is not uncommon with commercial oleic acid. Shaking the acid with dilute hydrochloric acid does not remove the iron.—W. S. Hughes (*J. Ind. Eng. Chem.*, 1917, **11**, 2280. From *Pharm. Journ. and Pharmacist*).

THE COMMON FROG'S HEART UNSUITABLE FOR DIGITALIS STANDARDIZATION.—The isolated heart of the common frog, *Rana temporaria,* should not be used for accurately standardizing digitalis, since it absorbs part of the active principles, and therefore behaves differently from the heart of the edible frog, *R. esculenta,* which alone should be employed for the purpose. The common frog's heart may prove useful as a control; and rough determinations within ten per cent. of accuracy may be made with it with digitalis and strophanthus. M. Krough (*Ugeskrift for Laeger: J. Amer. Med.* Assoc., 1917, **68**, 1672. From *Pharm. Journ. and Pharmacist*).

CHLORINE USELESS AGAINST MOSQUITO LARVÆ.—In view of the fact that a very small amount of free chlorine is sufficient to render a polluted water safe for drinking, experiments were made to see if it had an value as a larvicide on aquatic larvæ. It was found, however, that the larvæ of the mosquito, *Stegioma fasciata,* in tap water, or in stagnant water, their natural habitat, were unaffected by chlorine in a proportion of 1:25,000. In a 1:100,000 dilution all were killed in 24 hours. This proportion, however, is greatly in excess of what could be practically used. It is concluded that chlorine is useless for killing mosquito larvæ.—J. W. S. MacFie (*Report of Accra Lab. Trop. Diseases, Bull.: Chem. Abstr.*, 1917, **11**, 2247. From *Pharm. Journ. and Pharmacist*).

A NEW ACID SODIUM PHOSPHATE.—This salt, $Na_4P_6O_{17}$, for which the name sodium polyphosphate is proposed, is easily prepared by evaporating mixtures of sodium hydroxide or carbonate with phosphoric acid and heating the residue finally to a bright red heat in a muffle. The product is a vitreous mass slowly soluble in

cold water, more rapidly dissolved on warming. The solution is nearly neutral to both phenolphthalein and methyl orange. It is difficult to obtain the pure salt, since it has a powerful corrosive action, especially near its melting point, on vessels of all material. Platinum used with it becomes so brittle that it may be torn like paper; nickel was attacked until the mixture consisted entirely of nickel and sodium pyrophosphates; glaze of porcelain was badly corroded, alkalies being removed and silica liberated; even quartz dishes were perceptibly attacked and silica contaminated the salt contained in them.—J. H. Smith (*J. Soc. Chem. Ind.*, 1917, **36**, 419. From *Pharm. Journ. and Pharmacist*).

MEDICAL, PHARMACEUTICAL AND DISPENSING NOTES.

Methods of Control of Clothes Louse (*Pediculus Humanus Vestimenti*).—W. Moore, of St. Paul, shows that sachets are not sucessful. Talc, 20 Gm., creosote, 1 Cc., and sulphur, 0.5 Gm., is six times as effective a louse powder as naphthalene, creosote and iodoform, causing less irritation to the skin and, being dry, is easier to apply. Impregnation of the underwear does not appear promising, but a cheesecloth suit impregnated with saturated solution of sulphur in creosote could be successfully worn outside the underwear. Chlorpicrin can be used as a fumigant, penetrating the clothing and killing the lice in all parts of the clothing in fifteen minutes and the eggs in thirty minutes. By increasing the heat in the fumigation chamber, the time required to kill the eggs could be reduced. (From *The Journal of the American Medical Association*, March 23, 1918.)

Ameba Found in Trench Fever.—Truidin is convinced that the infectious disease he describes, known as "trench fever," is a disease sui generis. Also, that the ameba he found in the blood stands in some causal relation to it. He found the protozoon in 75 per cent. of his twenty-four cases, but exclusively during the first three days of the disease. The blood showed the characteristics of a severe blood disease. Coagulation was retarded; in some it began at the tenth minute, in others not until the twenty-third. The average was eighteen minutes. (From *Russkiyy Vrach*, Petrograd,

through the *Journal of the American Medical Association,* April 27, 1918.)

BENEDICT'S TEST FOR SUGAR IN URINE.—This solution for qualitative work, recommended by Dr. P. J. Cammidge as a test for sugar in the urine, according to the *Lancet,* is prepared as follows:

A. Sodium or potassium citrate	173	Grams
Sodium carbonate, anhydrous	100	Grams
Distilled water	700	Cc.

Dissolve by the aid of heat.

B. Copper sulphate, pure	17.3	Grams
Distilled water	100	Cc.

Cool the solution to the room temperature, and pour *B* into *A,* slowly and with constant stirring. Make up to 1,000 Cc. with distilled water. (*National Druggist.*)

COMMERCIAL AND TRADE INTEREST.

CELLULOID SUBSTITUTE.—Considerable interest has been aroused in the non-combustible substitute for celluloid which has been invented by a professor in a Japanese university, and for the manufacture of which a company has been organized in Japan. The factory buildings are now in course of construction and it is planned to begin in April of this year, or soon after, the manufacture of waterproof cloth, composition tiles and insulators. As soon as the machinery, which has been ordered in the United States, arrives, the manufacture of imitation leather, linoleum, stained glass, marble, lacquers and varnishes will be started. Patent rights have been obtained for the process in Japan and have been applied for in Great Britain, France and the United States. Of the twenty-one patents applied for in this country, eleven have actually been granted under date of November 6, 1917, and bear serial numbers 1,245,818 and 1,245,975 to 1,245,984, inclusive. (From the *Journal of Industrial and Engineering Chemistry,* April 1, 1918.)

PROCAINE, AMERICAN NOVOCAINE.—One of the first American owned and controlled companies to receive a license for the manufacture of drugs formerly made in Germany was the Rector Chemical Company, of New York, which holds license No. 5, for the manufacture of "Procaine," the drug introduced by the Germans as

"Novocaine." The name is a contraction of pro-cocaine, the drug being a substitute for cocaine, as explained by Dr. Julius Stieglitz in an article in the Journal of the American Medical Association of February 23, who announces that the Rector Chemical Company has had the assistance of Professor Bailey of the University of Texas in perfecting their manufacturing processes.

MAGNESIUM PRODUCTION IN THE U. S. A.—Prior to the war practically all of the magnesium used in the United States was imported from Germany, but since the stocks in this country were exceedingly small, it practically disappeared from the market in less than twelve months. The price reflected its extreme scarcity. In January, 1917, the American Magnesium Corporation was organized at Niagara Falls, N. Y., for the purpose of building a plant for the manufacture of magnesium and magnesium alloys. These works are now in operation and are producing the metal in such large quantities that the price has been greatly reduced and is rapidly approaching the quotations prevailing before the war. (*U. S. Iron Trade Rev.*, January 24, 1918.)

NEW SOURCE OF ALCOHOL.—As a commercial possibility, the nipa palm, abounding in the swamps of the Philippine Islands, seems to be unusually attractive, both as a producer of sugar and of alcohol. Already a quantity of the sap is used by Manila distillers in making what is regarded by many persons as the best alcohol manufactured. It is claimed that nipa furnishes the cheapest raw material in the world for the manufacture of alcohol and that denatured alcohol made in this way as a fuel for gasoline motors is cheaper than gasoline and fully as efficient. It is further stated that with a motor built for the use of alcohol this fuel would be twenty to thirty per cent. better than gasoline. There are over one hundred thousand acres of nipa swamp now available in the Archipelago, of which about 90 per cent. have never been touched, and it is estimated that the untapped swamp area of this island would yield fifty million gallons of alcohol fuel every season. (From the *Journal of Industrial and Engineering Chemistry*, April 1, 1918.)

MAIZE OIL.—The recovery of maize oil has been made compulsory in Hungary, and it is hoped to obtain 1,200 wagon loads compared with 300 last year. Maize oil is also recovered in Rumania, where one large mill in Bucharest alone produces daily 30 tons of

maize oil and 90 tons of residue, which is used as horse fodder. It has been estimated that by degerminating the whole of the Rumanian maize crop sufficient oil would be produced to increase the daily fat ration in Germany and Austria-Hungary by 12 per cent. (From the *Journal of the Society of Chemical Industry,* March 30, 1918.)

FORMOSAN CAFFEINE FACTORY.—Mr. H. Hoshi, president of the Hoshi Drug Manufacturing Co. of Tokyo, states that his Taihoku factory, where he has hitherto carried on experiments in the manufacture of caffeine, will begin the production of the drug on a commercial scale in June, 1918. He expects to be able to produce 5,000 pounds of caffeine per year and to refine the product in his Tokyo factory. The amount of caffeine which can be extracted from Twiwan tea varies from 3 to 10 pounds per 1,000 pounds of raw material, according to the quality of the tea used.

In the Shidzouka tea district of Japan the farmers themselves manufacture caffeine on a small scale. Mr. Hoshi purchases their product and refines it in Tokyo. (By Consul Max D. Kirjassoff, Taihoku, Taiwan, Jan. 7. From *Commerce Reports.*)

OUTPUT OF SANDALWOOD OIL IN MYSORE.—It is stated in the Mysore Administration Report for 1916–17 that the Sandalwood Oil Factory at Bangalore started work on May 10, 1916, and manufactured 50,690 pounds of oil up to the end of June, 1917. A net profit of $163,209 (after paying $262,125 to the forest department for sandalwood) was realized during the period. The value of the oil sold in transit to the London agency amounted to $188,493. The construction of another factory at Mysore at an estimated cost of $97,330 was undertaken during the year, and the work is nearing completion. The report says that the industry is placed on a scientific basis and the Mysore oil commands a good price on the London market. The services of two professors of the Indian Institute of Science as consulting chemists have been secured, and before shipment a sample is taken from each consignment of oil and a certificate of purity issued under their signature. (From *Commerce Reports,* April 6, 1918.)

CAMPHOR APPORTIONED TO UNITED STATES.—Consul M. D. Kirjassoff cables from Taiwan, Formosa, that camphor apportioned

for export to United States is 150,000 kin (198,416 pounds) each month April, May, June, and that apportionment for every three months thereafter will be according to production. (From *Commerce Reports,* April 8, 1918.)

TESTS OF AMERICAN AND FOREIGN CHEMICAL GLASSWARE.—Prior to the summer of 1914, the greater part of the chemical laboratory glassware used in this country was imported from Germany and Austria. The cutting off of imports from these countries caused a very serious shortage of glassware in this country, which is not yet entirely overcome. However, within the past two years a number of American manufacturers have increased their production of such ware, or are manufacturing grades of chemical glassware that they did not produce before. It is probable that practically our whole available supply at this time is of domestic manufacture, much of which is ware sold under brand names which were unknown a short time ago.

In order to furnish to chemists information regarding such domestic brands, it was decided by the United States Bureau of Standards to compare them with those of foreign make. These results of the bureau's tests indicate that all of the American-made wares tested are superior to Kavalier and equal or superior to Jena ware for general chemical laboratory use. Results of these tests are given in Technologic Paper, No. 107, "Comparative Tests of Chemical Glassware," Superintendent of Documents, Government Printing Office, for 10 cents. (From *Commerce Reports,* April 16, 1918.)

BOOK REVIEWS.

NEW SPECIES OF XANTHIUM AND SOLIDAGO.

Charles F. Millspaugh and Earl E. Sherff, in publication 199, Field Museum of Natural History, Botanical Series, vol. IV, No. 1, give a monographic account of five new species of *Xanthium* and one of *Solidago.*

The writers find the taxonomic status of the various species of *Xanthium* to be very unsatisfactory at the present time, partly because of the difficulty encountered in the past in identifying the older specific names, which in a number of cases were founded

upon heterogeneous material, partly since new and undescribed species in herbaria were confused with the commonly known species and, further, because of the surprisingly small number of any one species collected heretofore in a given region, accountable to the contempt with which common weeds such as *Xanthium* are often regarded.

The writers made a detailed study of 5 specimens of this genus, four of which were found in the herbarium of the Field Museum and a fifth in that of the Missouri Botanical Garden. They compared these with *Xanthium americanum* (which has for its fruiting involucre a bur distinctly ovoid in shape, 1.2–1.5 cm. long (exclusive of the beaks), the beaks straight or nearly so, and the entire body, aside from its prickles, more or less glabrous; the prickles straight from base almost to apex where they are usually hooked) and, finding the specimens so different from any form of *Xanthium* known to them, describe these as new species.

Xanthium leptocarpum Millsp. & Sherff has fruiting involucres which are reddish-brown or chestnut colored and are narrowly cylindric-fusiform, not ovoid. The prickles are very few in number and noticeably far apart.

Xanthium arcuatum Millsp. & Sherff has burs more or less of a reddish-purple shade, but the prickles are very numerous and mainly flexed or arcuate from the base to the apical hook.

Xanthium cylindricum Millsp. & Sherff has leaves much like those met with on *Hibiscus militaris* Cav. The burs have a body distinctly cylindrical, not ovoid, and the beaks are curved.

Xanthium crassifolium Millsp. & Sherff has subdeltoid, 3- or 5-lobed leaves and narrowly cylindrical-fusiform echinate burs.

Xanthium acutilobum Millsp. & Sherff has fruiting involucres resembling *Xanthium crassifolium*, differing from it in its subhastate, triangular, thinner and much larger leaves and in the characters of the akene.

An excellent taxonomic description is given of a new species of *Solidago* which the same authors name *Solidago emarginata*. This species has its lower leaves cuneate-oblanceolate in outline and distinctly notched at the apex. Its inflorescence suggests *S. speciosa* var. *angustata* T. & G. (*S. rigidiuscula* Porter) but its leaves do not possess the pronounced reticulations that are so characteristic of those of the latter species. Plates showing the principal characters

of the first four Xanthiums and *Solidago emarginata* accompany the article.

HEBER W. YOUNGKEN.

YEAR BOOK OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1916. Volume 5. Published by The American Pharmaceutical Association.

The appearance of the fifth volume of the series of "year books" issued by the American Pharmaceutical Association will be welcomed by all students of the advances made in the work of pharmacists and especially by those who are either engaged personally in research investigations or in guiding students who are undertaking such investigations.

The title page informs the reader that this publication is "corresponding to volume sixty-four of the former proceedings of the American Pharmaceutical Association." Since the *Journal* of the American Pharmaceutical Association has taken the place of the large amount of current literature and accounts of the meeting, etc., that formerly was published in the *Proceedings*, this unnecessary statement is not literally true and could very well be omitted.

The present volume follows very closely the style of its predecessors in arrangement, typography, content, etc. The Association data regarding the meetings of the Association, officers and committees, and the constitution, by-laws, rules and investments and the directory of members contains much that is needed for the workers within the Association.

The Report on the Progress of Pharmacy is the portion of the book that will appeal to the general worker in pharmacy and chemistry and contains a review of the valuable contributions to the literature during the year it records. It thus becomes not only an index of progress but a valuable source of information and of reference to original work on all subjects pharmaceutical or allied thereto. Necessarily under the war conditions now existing the references to continental European literature are limited.

G. M. B.

OBITUARY.

James L. Bispham.

James L. Bispham was the son of Samuel and Maria Stokes Bispham.

He was born December 19, 1833, on Filbert Street west of Eighth Street, Philadelphia. He attended school in Philadelphia and later at Lawrenceville, New Jersey, graduating in 1850 and delivering the valedictory address.

He learned the drug business with Bullock and Crenshaw, and later attended the Philadelphia College of Pharmacy and graduated with the class of 1854. He at once joined the College. At the time of his death he was the oldest member of the College in point of membership, being a member for sixty-four years. He carried on the drug business at 710 South Second Street from 1854 to 1892. (This was the place of business of Peter Williamson, one of the founders of the Philadelphia College of Pharmacy.) He was a director in the Southwark National Bank and a vestryman of Saint Andrew's Protestant Episcopal Church. In 1859 he was married to Mary Palmer, of Richmond, Virginia. One daughter survives, Mrs. Elizabeth P. Townsend.

He died April 3, 1918, and was buried in the churchyard of Trinity Church, Moorestown, New Jersey.

C. A. Weidemann.

NEWS ITEMS AND PERSONAL NOTICES.

P. C. P. Alumni Reception to Dean LaWall and Newly Elected Professors.—On Friday evening, April 26, the Alumni Association of the Philadelphia College of Pharmacy tendered a reception to the newly elected dean and professors. President Howard B. French acted as toastmaster and fathered the theme of the evening, "the new College buildings on the City's new broad park way." The following members of the faculty responded to toasts: Dean LaWall, Professors Sturmer, Stroup, Cook, Youngken, Gershenfeld, Bernstein and Emeritus Professor Sadtler.

HENRY S. WELLCOME VISITS HIS ALMA MATER.—Mr. Henry S. Wellcome, Ph.M., member of the well-known firm Burroughs Wellcome & Co., pharmaceutical manufacturers of London, England, paid a short visit to Philadelphia last month. As the guest of President Howard B. French he enjoyed visiting many of the places of interest in the city and in noting the great advances and the modern city that had developed since he was a student in the city.

In company with President French, on Monday afternoon, May 27, he visited the Philadelphia College of Pharmacy from which he was graduated in 1874 and from which he received in 1903 the honorary degree of Master in Pharmacy. The board of trutees of the College were in session at the time, considering the report of the Committee on Examinations and the Faculty as to the results of the recent examinations for diplomas to be conferred at the coming commencement.

Mr. Wellcome expressed to the board his gratification and appreciation of the successful and progressive work carried on so consistently by the College and his sense of indebtedness to his old teachers whose instruction had laid the foundation for his business career. He stated that when in Washington recently he was pleased to note the thoroughness of the scientific preparations of the Medical Department of the War Office; the elegant and compact mobile operating rooms and bacteriologic laboratories were cited as examples of the up-to-date methods of surgical and sanitary treatment to be employed. He predicted that in this war medicine and pharmacy would both have great responsibilities and that they would ably discharge their full duty and that pharmacy would ultimately receive the recognition which it deserved as a branch of modern medicine. He felicitated the Philadelphia College of Pharmacy upon the work and stand that it had taken and his confidence in the aid and support which it as an American institution and its graduates will be enabled to give to the government in the present world struggle for human liberty.

MAJOR COSSAR VISITS AMERICA.—In his trip around the world in the interest of the supply department of the Australian Medical Corps and to report on the condition of the pharmaceutical service for the Australian troops abroad and also on the conditions of pharmaceutical service in the armies of the allies, Senior-Major D. A. Cossar, ranking staff officer of the pharmaceutical service in the

Australian army, paid a visit to the United States and to Canada. He contracted both in the provinces and in the United States for needed medical supplies and arranged for their transportation.

At the outbreak of the war, Major Cossar was president of the Pharmaceutical Society of Australasia and conducted a pharmacy near Melbourne. Since his appointment as a pharmaceutical adviser, with the rank of captain, he has done much for the organization of a proper pharmaceutical service in the Australian army. His noteworthy services, exemplary for efficiency both in the saving of materials and men and for the economic management of medical supplies, have attracted the attention of the English-speaking nations. These are said to have had a telling effect in England and it is expected that in the very near future England will realize the necessity for reforms in the medical and pharmaceutical service of her armies.

Major Cossar has left Canada and via Vancouver is on his homeward journey.

PHARMACY STUDENTS SELL LIBERTY BONDS.—Liberty day being a general holiday, even for pharmacy students, the undergraduates of the Philadelphia College of Pharmacy inaugurated a Liberty Loan drive. Professor Louis Gershenfeld marshalled the forces and stimulated the efforts by offering to the student bringing in the largest total subscriptions a year's membership in the American Pharmaceutical Association. This prize was won by William L. Friedman, a junior student who reported subscriptions amounting to $3,500. The total subscriptions from this half-day effort amounted to over $12,000 with 206 subscribers. Thus these younger pharmacists are giving support and encouragement to their comrades who in increasing numbers are enrolling under the flag.

EDITOR CRAIG SEVERS CONNECTION WITH THE N. A. R. D. JOURNAL.—Mr. Hugh Craig, who has, for some years past, inspired with his pen the membership of the National Association of Retail Druggists, has retired from the editorship of that association. We wish Mr. Craig a full measure of success in his new connection with the Nyal Combination of Detroit.

W. W. SOLLIDAY ASSOCIATED WITH MCKESSON AND ROBBINS.—Mr. W. W. Solliday, a graduate of the Philadelphia College of

Pharmacy and who was initiated into the art of the apothecary in an Easton, Pa., pharmacy, has become the sales manager of the pharmaceutical and specialty department of McKesson and Robbins, of New York. Since his graduation from College, Mr. Solliday has had unusual opportunities with several large commercial interests in Philadelphia and New York and the experience and knowledge thus gained coupled with his ability will doubtless enable him to fulfill his greater expectations.

PROFESSOR THOMAS FRAZER RESIGNS.—Sir Thomas Frazer, M.D., has resigned the chair of materia medica at the Edinburgh University. Dr. Frazer was a member of the committee that prepared the latest revision of the British Pharmacopœia.

BURROUGHS WELLCOME & CO. HONOR FAITHFUL EMPLOYEES.—In recognition of faithful service extending over a period of twenty-one years, Burroughs Wellcome & Co. recently presented watches to the following of their employees: Mr. Albert A. Venables, of the home order department; Miss Maud A. Hollis, Wellcome Chemical Works, and Mr. Archibald C. Lodge, Wellcome Chemical Works.

JOSEPH JACOBS AS AN EDITORIAL WRITER.—Pharmacist Jos. Jacobs, of Atlanta, Georgia, has added another "bit for the cause" in two editorials appearing in recent issues of the *Atlanta Constitution*. The one on "Pharmacists in the Army" is an able appeal for better pharmaceutical service in the Army and the enactment of the Edmonds' bill.

The other on "Everyday Patriotism Needed in Winning War" is a well-worded "Americanism" meriting reproduction:

> There is the making of a true patriot in every man, even though he may never see a uniform or attend a flag raising.
>
> The real patriotism consists in doing your work well—giving the best service that is in you—giving it with a wide-open heart, with the thought that all you can have, all you can hope to have, you can give to your country's call.
>
> This should be the platform, the creed, of patriotic business. We can serve our country best by doing our level best in whatever line of endeavor we have undertaken. Honest success, wherever achieved, is patriotic, provided there is back of it a willingness, a purpose, to give whatever is needful to be given to the country's service.
>
> So it is not always the man in uniform; not always the man leading the charge; not always the man plugging the U-boats, who has a monopoly on patriotism.

These men have offered their lives, their all, that their country may be preserved from the foot, or even from the attempt, of the invader. They can give no more.

But back of these men—an essential complement to them—are the patriots of peace, or, rather, of peaceful endeavors—the builders and the workers—the hewers of wood and the drawers of water.

And no matter how humble in rank, each is a patriot who does his duty as he finds it, does it well, and stands prepared to give what he has, in service or in wealth—perhaps in both—to the safety of the nation.

Giving, of course, presupposes the ability to give. To give we must have or we must earn. And none should cease to earn, through service, as long as he is endowed with the earning power.

Only in this way can we meet our country's call. Only as we earn can we pay the taxes it demands, buy Liberty bonds, war savings certificates and do our duty by the varied activities which strengthen and lighten the burdens of the men who are fighting for us.

We can not all fight in the trenches. But if we do our duty—our level best—here at home, we have supported the man in the trenches and made it possible for him to fight a better fight. We have stood with him; we have held him up.

That's our fight, and it may be just as patriotic, just as courageous, as if we fought it with machine gun or bayonet.

It is, if we make it so.